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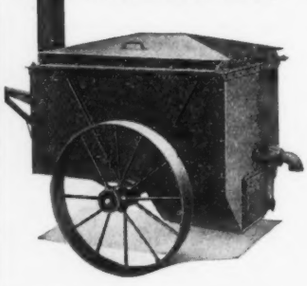

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City County State

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ENGINEERS AND UNIONS.

The American Association of Engineers is differentiated from other societies of engineers chiefly by the fact that its most significant aim is the increasing of the salaries of engineers. It has already met with some success in this, and is now engaged in a campaign for better salaries for engineers in public employ.

The society has been accused of attempting to "unionize" the engineers of the country, which accusation it has denied emphatically. Unquestionably, five years ago not one per cent of the civil engineers of the country would have considered joining a "trade union"—the idea was considered decidedly non-professional. But the war has revolutionized more things than the map of Europe, and we learn of an old established local engineering society applying for membership in the American Federation of Labor.

The latest startling move in this direction occurred last month, when the scientific and technical employes of the federal government organized as a branch of Local No. 2 of the Union of Federal Employes, affiliated with the American Federation of Labor. (One thing to be borne in mind is that the constitution of the union pledges all its members not to strike nor to support any strike against the government.)

But the coming together of workers at trades and members of scientific professions has not been accomplished by movement of the latter only. The A. F. of L. at its Atlantic City convention adopted resolutions recognizing that "scientific research and the technical application of results of research form a fundamental basis upon which the development of our industries, manufacturing, agriculture, mining and others, must rest"; that "the health and well-being . . . of the whole population are dependent upon advances in medicine and sanitation," and that the advancement of workers of all grades in standards of living is dependent upon scientific research; and finally that "a broad program of scientific and technical research is of major importance to the national welfare and should be fostered in every way by the federal government, and that the activities of the government itself in such research should be adequately and generously supported in order that the work may be greatly strengthened and extended; and the

secretary of the federation is instructed to transmit copies of this resolution to the President of the United States, to the president pro tempore of the Senate, and to the speaker of the House of Representatives."

We feel sure that this will prove to be not a joining of professional men with other classes of employes in the wrangling dispute with the capitalists, the common employers of both, which is so generally disapproved of by the great majority of the "middle classes," but something entirely different from this—another important step toward a new era when laborers, trade workers, professional men and "leaders of industry" shall work together for the common good, and capital shall be the common servant of all.

And no set of men can do more to bring this about than engineers. As a class, they enjoy the respect and confidence of both capital and labor. A "Union of Engineers," affiliated with the A. F. of L., but with its own constitution and own methods of working, is a future possibility that may mean much for the rapid and peaceful evolution of the coming social organization in this country.

CONSTRUCTING CONCRETE ROAD NEAR NORFOLK

Up-to-Date Machinery and Methods Employed—Central Mixing Plant and Distribution of Concrete by Trucks—Time Study of Mixing and Distribution—Mechanical Finisher Used—Cost Figures.

By W. A. HARDENBERGH.

Unusual methods and up-to-the-minute machinery are being employed in the construction of a section of concrete road near the army and navy bases, Norfolk, Va., a part of the intricate system of roads connecting the supply bases, storehouses, wharves and piers, the various parts of the camp, and the city. The supervision of the construction is under the direction of the Constructing Quartermaster of the Army, while the Ulen Construction Co. is doing the actual work.

Concrete for the road is mixed at a central mixing plant and is conveyed in motor trucks to the road, where it is dumped directly on the sub-grade and spread by hand to the required thickness and section. Lakewood gasoline-engine-driven finishers are used to tamp and surface the concrete. No expansion joints are being used at present except at the completion of each day's work. In that part of the road first constructed, expansion joints were used at 50-foot intervals. "Elastite" joints were used mainly.

The adoption of the central mixing plant method for the construction of this road was governed by factors other than those that ordinarily would influence a contractor about to begin the construction of five miles of 18-foot concrete road. At the time this method was adopted (last fall) it seemed certain that other roads, located near the site adopted for the central mixing plant, would also be built; owing to local conditions there was scant space for storage piles of aggregate along the right-of-way; it was thought that the problem of handling the aggregate would be much simplified; no special machinery, as paving mixers, would be required; with the addition of extra trucks to carry the concrete, it was thought that work could be handled more flexibly by this method, and in those localities where weather and other conditions were most favorable.

An additional and highly important factor was the fact that trucks were much easier to hire than labor. That is, the trucks and drivers were hired by the hour and laid off at such times as they were not needed or if conditions were unfavorable for work; while labor was hard to get, and if laid off for brief periods, could not again be secured. The use of paving mixers and a gang would necessitate steady employment of the entire force, whether work was being carried on or not. These men were largely replaced by trucks with the central plant plan.

The mixing plant was constructed along the edge of the railroad yard built especially for the use of the supply bases and ample siding space was available. Aggregate cars were unloaded by a clam-shell bucket. Much of this work was done at night, partly to save demurrage and partly because the bucket was also used during the daytime to assist the sand and gravel elevators in furnishing stone and sand to the mixer. Six men were used in a car to guide the bucket and assist in unloading generally. There was small storage space in the mixing shed and the sand and coarse aggregate were piled convenient to the elevators and raised to the bins as used.

A Smith mixer, having a rated capacity of about three-quarters of a yard, was used. This was mounted at such a height that the motor trucks were driven beneath. The concrete was then discharged directly into them from the mixer. Two batches were considered a load for a truck, no matter what its size. Despite some minor faults of design in the matter of handling and routing materials in the mixer shed, the mixer averaged throughout the day about two batches in three minutes and did this regularly, so that there were rarely any trucks waiting in line and but little time was lost by the trucks at the mixer end.

The trucks were hired mainly from local firms at the rate of $2.50 per hour, with 65 cents additional for the drivers. The trucks were paid for only while working, though the contract provided that they be kept in repair by the government, which also furnished gasoline and oil. A repair shop was maintained in connection with the mixer and a chief mechanic was in charge of all work. With very few exceptions, the trucks were all White and Packard, mainly of 3 to 5 tons capacity. The number of trucks hauling concrete varied with the length of haul; some additional trucks were used on grading work.

The length of the road is about 5 miles. The mixing plant was so placed that the longest haul was not in excess of 2¾ miles. It was assumed that for fifty minutes there would be no setting action of the concrete. Allowing for a factor of safety, the work was so scheduled that not more than thirty-five minutes was supposed to elapse between the time of mixing and the dumping of the concrete on the subgrade. This schedule was pretty rigidly adhere to; except on the longest hauls, the time ordinarily consumed was considerably less than this.

The greatest loss of time occurred in getting the truck into position to dump. The road under construction was on one side of an electric railway (double track), while the road over which the material was being hauled was on the other side. Crossovers were placed as near together as possible, but it was frequently necessary to back the trucks for as much as three hundred feet, at

times even more. Coupled with a few soft spots in the subgrade, where the heavily loaded trucks would be still further delayed, this part of the work was hardest to keep on exact schedule. Generally speaking, the schedule of the trucks was about as follows, assuming a one-mile haul: Loading, including turning at the loading station, starting, etc., 5 minutes; driving to place of dumping (this was through very heavy traffic and over a viaduct with a long and rather stiff grade), 10 to 12 minutes; backing into position, dumping and unloading, 8 to 10 minutes; return trip 10 to 12 minutes. This gave a total time for the round trip of about 40 minutes, with an average number of trips per 8-hour day of about 12. On the 2¼-mile haul, 6 to 8 trips were made daily. On the whole, it was found that 15 to 20 minutes were consumed in loading and unloading, while a rate of 6 to 10 miles an hour was maintained between the mixer and the road. An excellent road (bituminous macadam) was available for the entire haul and this fact greatly aided the work.

The bodies used for hauling the wet concrete were not unusual. Especial tightness did not appear to be necessary, nor was there any leakage noticeable. The aggregate settled to the bottom and the more liquid material rose to the top. Where the rear end board of the body did not fit tightly, a piece of burlap laid along the crack prevented leakage. Every truck was equipped with a power dump with one or two exceptions and these had a balanced hand-dump arrangement that was almost as good, though a little slower. A very dry mix was used compared with that usually employed with a paving mixer on concrete road construction. There was, as stated above, considerable separation of the ingredients, but this did not appear to cause any bad results. With a longer haul or a rougher road or both, there might have been some evil effects. Also, since the aggregate would have been packed much more tightly, the removal might have been a matter of considerable moment, especially in regard to the laborers required and the time lost by the truck while the mass was being removed.

Three men were usually employed in scraping out the trucks, etc. After the truck was unloaded, these men and two others raked and hoed the concrete into place, spread it to the required thickness and brought it roughly to the required shape and grade. Tamping and finishing were done by means of a Lakewood finisher. This device is driven by a small gasoline engine and has three distinct operations. First comes the template, which brings the surface to the proper section and contour. Following this is a wooden bar, also cut to the proper cross-section, which moves violently up and down, tamping and compacting the concrete. In the rear of this is a canvas belt about a foot wide, which is moved back and forth across the road to give it a finished surface. No brooming was done, but some trowel finishing work was necessary here and there. After 24 hours, the road was covered with earth to protect it while curing.

Owing mainly to the fact that wooden side forms, warped and worn, were used, two men were required to operate the finisher. In the condition in which they were being used, the forms furnished a very poor trackway for the finisher, which had to be guided lest it run off. Another man assisted with the finisher and did the trowel work when necessary.

Work was carried on at two places. This was necessary because of the fact that the number of trucks that could operate in one place was limited. A finisher was used at each place. The daily total of work amounted to from 450 to 600 feet per day of completed road. No attempt was made to increase the amount of work by fostering a spirit of rivalry between the two gangs.

The road is 18 feet wide, 7½ inches thick in the center and 5 inches at the edge. The concrete is mixed 1:1½:3, Edison portland cement being used mainly. No reinforcement is used except at expansion joints, where round iron bars are placed at 1-foot intervals to prevent buckling. Expansion joints are now placed only at the end of each day's work.

Not a great deal of grading is necessary. Most of this work is light and is best done by hand. Over the greater part of its length, the new road follows an old and little used highway, while the country is generally very flat and there are no hills. The main problem in grading was encounterd where the right-of-way crosses a very soft marshy area. A small amount of fill was available from nearby sources and this was moved with No. 3 Standard Supply and Engineering Company 2-wheel dump scrapers, each drawn by a pair of mules, with a snatch team for loading. The remainder of the fill is being hauled some three miles by motor truck. Loading is done by a steam shovel and the round trip of three miles, dumping, return and loading, is made regularly in one hour. Like the other trucks, these are White and Packard and are hired under the same conditions as the others. Three yards is considered a load.

Materials such as broken stone, sand and cement, are being furnished from the supply base. Omitting the cost of these materials from consideration, the construction cost of the pavement has been in the neighborhood of $30,000 per miles of completed road. Per square yard the price has run from about $3.20 down to the present mark of $2.80 and there is a likelihood of a still further reduction before the work is completed. The work was started last fall, but was suspended before much progress had been made. Started again this spring under the present management, progress has been much more satis-

TRACTORS DRAWING SWEEPING MACHINES IN ALBANY, N. Y.

factory. Labor has been hard to get owing to the great demand for it at nearby camps and on neighboring construction. The rate paid is 46 cents an hour. About 175 men are now at work on this particular job.

Throughout, the work shows careful planning and good management. Operating under the conditions under which this road is being built, there are numberless chances for costs to rise. Succeeding to a plant not constructed according to their own ideas and, in some details, not wholly fitted for the work, the men in charge have handled the job admirably and the steadily decreasing costs under their management may be an augury that this method of constructiton may become, if not a standard, at least more popular than it is now.

MOTORIZATION OF SWEEPING MACHINES.

By WILLIAM J. COFFIN.*

The Street Department of Albany, N. Y., is now using tractors for hauling the sweeping machines. The tractor is a Ford unit with the Union Truck attachment. The sweeping machine is the ordinary type of horse-drawn sweeper from which the front truck is removed, the sweeper being connected to the tractor by a rocking fifth wheel. The arrangement is shown quite clearly in the accompanying photograph. It will be noted that the sprinkler tank is mounted on the tractor. This is done in order to get the water on the pavement a considerable distance ahead of the broom to properly moisten the dirt. The distributor pipe of the sprinkling system is located close behind the front wheels of the tractor.

The tractor speed is about one-third that of the ordinary Ford car for a given engine speed. This makes it possible to operate entirely on direct drive, excepting on a few very steep grades, and insures an evenly running machine at low speed.

It is found that the tractor sweepers operate successfully at about double the speed of the machines when horse-drawn, but it is necessary to gear down the rotary broom drive so that the broom will revolve at about the same rate as when the machine is horse-drawn. While the speed when sweeping is doubled, the speed over the route figured on total time is about one-third greater than that of the horse-drawn machine, as the tractors must stop to fill the sprinkler tanks while the horse-drawn machines are preceded by a sprinkler wagon. Three tractor sweepers will take the place of four horse-drawn sweepers and the horse-drawn sprinklers.

WATER METERS IN MILWAUKEE.

On January 1, 1919, the Milwaukee water department had in service 65,072 water meters, of which, 55,586 were ⅝-inch, 6,939 were ¾-inch, and 57 were larger than 4-inch. During the year 1918, 14,824 meters, or 22.7 per cent of those in service, were repaired, the repairs on 10,595 consisting of minor adjustments for accuracy of registration or for the removal of accumulated sediment, which repairs are chargeable to the Division of Meters and Services. The remaining 4,229 required new parts and the repairs were charged to the owner or consumer. Of the former repairs, 5,328 were made on the premises.

Annual tests on the premises of meters ranging in size from 3-inch to 12-inch have been carried on by the division for seven years, with a view to maintaining accuracy of registration. Last year 266 such meters were tested, and the average under-registration found was 2.86 per cent.

The total cost of operation of the division for the year was $52,675.41, and $23,026.77 was received for repairs and sales. The average cost per meter (all sizes up to 12-inch) for repairs, both material and labor, was $2.14, or 48 cents per meter based on all meters in service. The cost of operation and repairs—all expenses of the division—per meter in service was 80 cents, or 45 cents if the revenue received be deducted.

REFUSE COLLECTION IN ROCHESTER*.

Horse-Drawn vs. Motor Vehicles — Work Methods Employed and Suggested Changes—Frequency of Collection—Amounts of Refuse.

Comparing motor trucks with horse-drawn wagons for refuse collection, the report says "Enthusiasts advocate this method of hauling as a panacea for all the troubles of collection. As a matter of fact, however, the solution of the hauling problem cannot be reached so easily. Motor equipment might prove more economical than team hauling in one city and more costly in another. It is a question of comparative costs which must be determined for each locality.

"The largest factor in determining whether motor trucks will prove economical is the relative time spent in loading and in hauling. Unless hauls are extremely long, the loading time in collection is bound to be extremely high. Where the refuse can be delivered to a central unloading station and from there hauled to the point of disposal, without doubt there is advantage in the use of motor vehicles for the second part of the operation. But the practicability and economy of central loading stations depend largely upon local conditions as to length of haul, and it is believed that relay stations are not necessary and would not prove satisfactory in Rochester. This is true because the average length of haul is about one mile and a half. Furthermore, where loading stations have been used, the public has registered such serious objections that in a few instances at least they have been abandoned."

In an appendix to the report are given a number of figures as to costs of horse-drawn and motor truck collection wagons which we will refer to later. It is estimated that for Rochester the cost per day of a 3½-ton truck would be $12.69, that such a truck would collect 36 cubic yards a day on the average, making the cost per cubic yard 35.3 cents; while a horse-drawn wagon would collect 20 cubic yards a day, making the cost 30 cents with hired teams or 28.3 cents with city-owned teams.

Under other conditions and for certain of the work in Rochester, however, it is believed that motor trucks would be economical. For instance, two trucks have been purchased for use in pick-up work and it is believed that these will prove economical for collecting ashes from places where they accumulate in large quantities because of the short relative time required for loading. It is recommended that a 1½-ton truck be purchased for pick-up work in garbage collection, this truck to be sent out in answer to complaints of non-collection and to collect small dead animals. Also it is believed that a 2½-ton truck equipped with a 3½-yard body could be used to advantage for collecting garbage in the Charlotte district, where the length of haul is approximately 6½ miles, and in the Cobb's Hill district, where the haul is 2½ or three miles and the stops are widely scattered.

*Deputy Commissioner of Public Works, Albany, N. Y.

* Continued from page 466.

WORK METHODS.

Concerning the work methods, it was found that the chief causes of complaint, aside from irregular or infrequent collections, were the rough usage of receptacles, the scattering of refuse on walks and lawns, and—in the case of garbage collections—leaving the covers off the garbage cans after collection. The remark is made, however, that the latter is an excellent thing in that it allows sun and air to disinfect the cans and is a hint for householders to wash them thoroughly before using them again. These matters can be remedied with a little care on the part of the supervisory force.

It is suggested that the working hours and routes of the garbage collectors be adjusted to make it possible that the collectors work a full eight-hour day for six days a week; and that collections be made regularly the stipulated number of times each week for each stop, and in particular, as nearly as possible on the same day or days each week. The latter would enable householders to keep their garbage cans where the contents would not freeze in winter, setting them out only in time for collections to be made. This alone undoubtedly would reduce the number of complaints made as to rough handling and failure to remove the whole contents of the containers, and would enable the collectors to do their work at greater speed.

Greater care should be taken to prevent scattering of refuse, especially garbage, about premises and streets. This would require not only improved supervision by the department, but the provision by the public of adequate and standard containers and proper separation of refuse.

Garbage wagons should be kept covered at all times. This is merely a matter of supervision.

The unnecessary banging of receptacles, the rapid driving of noisy vehicles over rough streets and other unnecessary and undesirable noise should be eliminated, especially in the early morning hours. This also is a matter of supervision. Its accomplishment would greatly improve the feeling of the public toward the collection force.

Not only should garbage wagons be frequently and thoroughly cleaned, but the householders should wash out and thoroughly clean their receptacles each time collections are made. This is a simple matter which, strangely enough, does not seem to be given attention by many householders.

Work schedules should be arranged for ash and rubbish collection so that collections will be made from each stop with regularity and as nearly as possible on the same day or days of each week.

Care should be taken that all the rubbish possible be collected in the rubbish wagons and not drawn to the ash dumps. This is a matter not only of supervision, but one that demands improved co-operation from the public in the proper separation of rubbish from ashes in separate containers.

FREQUENCY OF COLLECTIONS.

The frequency with which collections of refuse are made should be governed by a number of factors, each considered in relation to the others. The more important are:

1. The composition of the refuse and the degree of its separation and method of storage at its source.
2. The climate and the season of the year.
3. The character of the population and standards of living.
4. Density of population.
5. Quantity of refuse produced.
6. Method of collection and of disposal.

All of these may be summed up under the two heads of health and convenience of the public, and cost.

In the case of garbage, within reasonable limits neither the quantity produced nor the cost of collection is as important as the elimination of nuisance from the standpoint of health and convenience. For this reason frequent collection is more important in warm weather than in cold, and in southern climates than in northern ones. If public convenience alone were considered, it would probably be removed daily. Moreover, if garbage is used for feeding hogs it must be fresh, and if disposal is by reduction, frequent collection is advisable because of the increased acidity of stale garbage. On the other hand, roughly speaking, it costs half again as much to make semi-weekly collections as it does to make one collection a week, and the cost of three collections is at least twice the cost of one per week.

If ashes are collected separately, the frequency can be governed almost entirely by the convenience to the public and cost to the householder and to the city. There is some saving effected in making collections if the ashes are allowed to accumulate to some quantity before removal. Where they must be removed from the premises, however, it costs proportionately almost as much per unit of quantity to make a collection where there are four or five filled receptacles as where there are only two or three. The less the frequency of collection the greater must be the number of receptacles used by the householder and consequently the greater the cost to him.

The frequency with which rubbish should be removed depends largely on the nature of the material and the quantity produced. If garbage is mixed with the rubbish, even to only a slight extent, it soon has objectionable odors. (This is true if cans and containers used for the storage of food are included with the rubbish.)

If the rubbish is kept exposed to the weather it becomes wet and soggy and paper materials lose much of their salvage value. Also, frequent collections are necessary from the standpoint of public convenience. Rubbish usually accumulates rapidly and, unless collected at comparatively frequent intervals, is liable to become a nuisance or a dangerous fire hazard.

There seems to be no generally adopted practice with reference to frequency of collection. In most cities it seems to depend upon the amount of equipment and funds available.

In the Rochester report the following is recommended:

1. In the *business districts*, *daily* collections of *all classes* of refuse should be made throughout the year, as at present.

2. In the *residential districts*:

a. *Two* collections of *garbage* should be made each week during the months of May, June, July, August, September, October and November, and *one* collection each week during the months of January, February, March, April and December. No stop in the residential districts should be given service oftener than twice a week, unles it can be proven that such service is absolutely necessary. It is important, however, that two collections be made each week in *all* parts of the city during the summer months, rather than that certain sections shoulud receive more frequent service than others as is the case at present.

b. *One* collection of *ashes* should be made each week during the months from October to May, inclusive, and one collection in every two weeks during the summer months from May to September, inclusive. The exact time for changing from the weekly to semi-monthly collections, or vice versa, cannot be determined in advance; it will vary with the season. Usually, however, the change from the weekly to the semi-monthly schedule should be

made sometime shortly after the first of May, and the change from semi-monthly to weekly collections should be made about the middle of October.

c. *One* collection of *rubbish* should be made every week throughout the year.

AMOUNT OF REFUSE.

As a general rule, the maximum quantity of garbage is produced in the late summer and fall months, and the minimum production occurs during the winter months.

Obviously the maximum quantity of ashes is produced during the cold winter months and the minimum quantity in the summer. The production of rubbish is fairly uniform, but there is some variation, the maximum amount being produced in spring and the minimum during the winter months. The quantities of refuse colected in Rochester during 1916 and 1917 are shown in the form of curves on the accompanying diagram.

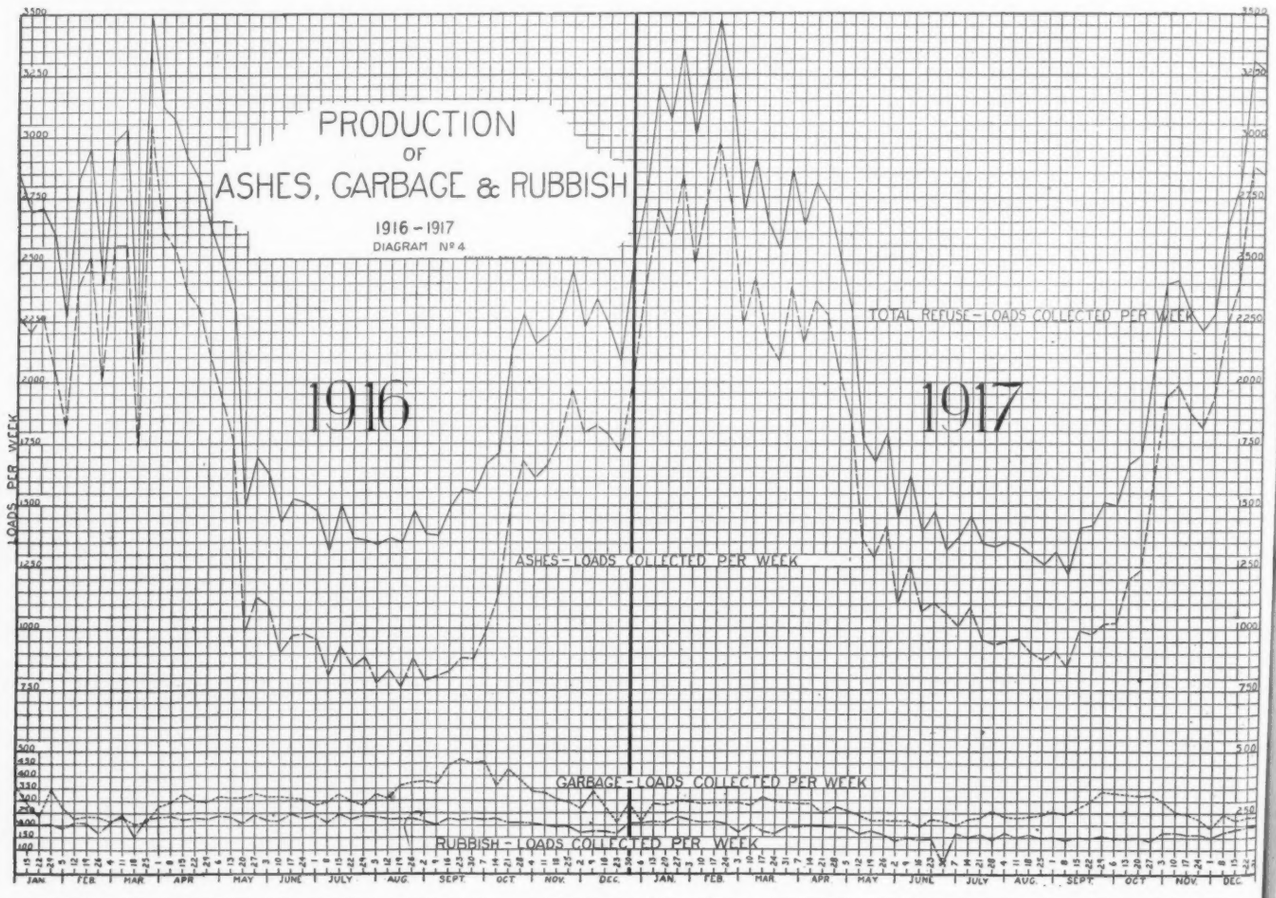
Approximately 31,724 tons of garbage were hauled to the reduction plant in 1916 and 25,949 in 1917, the smallness of the latter figure being due probably to the high prices of food materials and patriotic war conservation. Part of the decrease, however, was due undoubtedly to the greater activity of private collectors in removing an increasing percentage of garbage for feeding to hogs or other private uses. The maximum quantity of garbage is produced during a short period in the months of September and October, when for two or thre weeks production is practically twice what it is during most of the rest of the year.

It is interesting to note how closely the variations in the curve correspond for similar periods during the two years. A high point is reached for the week ending April 15, 1916 and a similar point for that ending April 28, 1917. Another high point is indicated in July of each year. There is a slight decrease for two weeks in August and a sudden decided increase about September I. Also in each year a decided increase in the week following Thanksgiving. These indicate the effect of feast days, canning seasons, berry time, etc. on garbage production.

ESTIMATED PRODUCTION OF REFUSE IN ROCHESTER.

Class of Refuse	—Tonnage per Week— Average	Maximum	Minimum	—Average Production per Year— Pounds per capita	Pounds per stop	Per cent of total	—Pounds Produced per Stop per Week— Average	Maximum	Per cent of Average	Minimum	Per cent Average
Ashes	3,800	6,000	2,000	1,520	8,380	82.6	161	254	158	85	53
Rubbish	200	250	150	80	440	4.4	9	11	122	6	67
Garbage	600	950	450	240	1,320	13.0	25	40	160	19	76
All refuse	4,600	6,700	2,800	1,840	10,140	100.0	195	284	146	119	61

NOTE.—The maximum quantity of ashes is produced during the months of January, February and March; the minimum quantity is produced during the months of April, May and June; the minimum quantity is produced during the months of November, December, January, February and March. The maximum quantity of garbage is produced during the months of September and October; the minimum quantity is produced during the months of February and March. The maximum quantity of all refuse together is produced during the months of January, February and March; the minimum quantity is produced during the months of June, July and August. The estimated tonnage per week is based on the quantities collected in 1916 and 1917. Per capita production is calculated for an estimated population of 260,000. Per stop production is calculated for 47,200 stops, the number counted in the receptacle canvass made March 13-19, 1917.


PRODUCTION
OF
ASHES, GARBAGE & RUBBISH
1916 - 1917
DIAGRAM Nº 4
1916
1917
TOTAL REFUSE - LOADS COLLECTED PER WEEK
ASHES - LOADS COLLECTED PER WEEK
GARBAGE - LOADS COLLECTED PER WEEK
RUBBISH - LOADS COLLECTED PER WEEK
LOADS PER WEEK
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

WEEKLY AMOUNTS OF ASHES, GARBAGE, RUBBISH AND TOTAL REFUSE COLLECTED DURING THE YEARS 1916 AND 1917.

In the accompanying table the authors of the report have made an estimate of the amount of refuse to be provided for in Rochester, based on the quantities collected in 1916 and 1917. The average maximum and minimum estimated tonnage per week are indicated for each of the three classes of refuse separately and for all together. The maximum production of combined refuse is not as great as the sum of the maximums of the three kinds separately, nor is the minimum as small as the sum of the three minimums, since both minimums and maximums of the three different kinds of refuse occur at different times of the year, the maximum quantity of garbage, for intance, being produced during the season of lowest production of ashes.

The amount of ashes collected is more than 80 per cent by weight of all the refuse. The variation in the quantity of ashes is much greater than the variation in either of the others, the maximum production of ashes being 158 per cent of the average and the minimum only 53 per cent, while the maximum production of rubbish is 122 per cent of the average and the minimum 67 per cent. The maximum production of garbage reaches 160 per cent of the average, but only for a very short time, and the minimum garbage is 76 per cent of the average. The estimated annual production of garbage is 240 pounds per capita, of rubbish 80 pounds, and of ashes 1,520 pounds. It is estimated that the average quantities per stop per week are 161 pounds of ashes, 9 pounds of rubbish and 25 pounds of garbage.

(To be continued.)

NIAGARA FALLS AND WATER CHLORINATION.

Method of Manufacturing Hypochlorite and Liquid Chlorine—Development of Apparatus for Applying the Latter—Extent of Use.

A paper was read before the convention of the American Water Works Association by John A. Kienle entitled "The Relation of the Chemical Industry of Niagara Falls to the Water Works," the first part of which paper was devoted to a more or less general account of the electrochemical industries at Niagara Falls that are of more or less direct benefit to water works.

The total potential power of the falls is given as six million horse power. The United States is now using about 375,000 electric horse power generated at the falls, of which 44,000 is used in the electro-chemical industries and 35,750 is used by municipalities. Among the products made possible by this electric energy are aluminum, abrasives, calcium carbide, ferrosilicon and other ferro alloys; and tungsten, and numerous other substances, alloys and chemicals are produced by means of this electric energy.

The major interest of the author and of water works men generally, however, centers in the manufacture of liquid chlorine and bleaching powder. Bleaching powder is made by passing chlorine gas over hydrated lime, the lime being spread in ridges on the floor of a chamber or room so as to expose as large a surface of it as possible to the action of the chlorine. There are several chambers in series, and the gas that is not absorbed by the lime in the first chamber is turned into others in succession until the emerging gases are free from chlorine. The lime absorbs 35 to 40 per cent of chlorine, and when the gas has been removed from the chamber it is shoveled through a chute into drums or barrels. Hypochlorite, when exposed to air, loses its chlorine strength rapidly, and even when sealed in drums decomposition occurs, especially in hot weather.

Chlorine was liquefied commercially in Europe about 1889, but its manufacture was not successful until pure chlorine gas was obtained by use of the electrolytic cell, in which the electric current breaks up common salt into chlorine and caustic soda. There are two types of cells in actual use, one in which the two electrodes are separated by a porous partition or diaphragm, and the other a cell in which there is no diaphragm, but in which mercury cathode dissolves the sodium metal as it is formed.

Of the first type or diaphragm cell there are many varieties, those most commonly used in this country being the Nelson, Allen-Moore, Wheeler, Townsend, Dow and Billiter. The main points of difference between them lies in the disposition of the diaphragm and the anode, which is in all cases of Acheson graphite. The chlorine formed at the anode in any of these cells is much purer than that formed by the older chemical process, running from 40 per cent to 98 per cent chlorine, with a small percentage of carbon dioxide, oxygen, and in some cases hydrogen.

Pure chlorine gas condenses to a liquid at ordinary atmospheric pressure at —34° centigrade, and at ordinary temperatures (about 15° centigrade) becomes a liquid at a pressure of six atmospheres. If the gas contains less than 100 per cent of chlorine, either greater pressure or lower temperature, or both, is required. Chlorine when dry attacks few of the metals, but before drying must be handled in lead or stoneware conduits and containers. Before compression, the gas is dried in coke or stoneware-packed towers by the use of stronge sulphuric acid, which absorbs the moisture but dissolves only a small amount of chlorine. Pressure is used to liquefy the gas, different means for obtaining the pressure being employed, some being similar to air compressors, and others depending upon the head of a falling stream of sulphuric acid to give the necessary pressure, a tower 75 to 100 feet high being used for this purpose. After being compressed, the chlorine gas is cooled by mechanical refrigerator machines to from —30° to —70° centigrade. The chlorine gas so liquefied is drawn off into cylinders or other containers for shipment.

The writer believed that the use of chlorine for sterilizing public water supplies has been the most noteworthy single contribution to the art of water purification in recent years. This use of hypochlorite was first carried out successfully by George Johnson at the Chicago stock yards in 1907, and was adopted so rapidly by water plants that by the end of 1911 approximately 500 water plants had been equipped with a hypochlorite installation and close to one billion gallons of water thus sterilized. The introduction of chlorination settled at once, and apparently for all time, the much mooted controversy between sanitary engineers on the question of the suitability and ultimate efficiency of rapid and slow sand filtration as the correct means of water purification.

It is perhaps purely coincidence that in 1911 and 1912 there was a temporary interruption in the downward trend of the country's typhoid rate which has been caused, it is believed, by the use of hypochlorite. The writer believes, however, that the use of hypochlorite as a sterilizing agent had about reached its maximum of usefulness because the greater part of the plants where it could be used with proper control and supervision had by this time been equipped with hypochlorite plants. The inherent disadvantage in the use of this chemical for sterilization by a small city is illustrated by the case of Xenia, Ohio, where a rather severe typhoid epidemic was due solely to the failure of the attendants in charge to realize that the hypochlorite had lost its strength. (See Municipal Journal for January 11, 1919).

The writer therefore unhesitatingly makes the deduction that it is extremely fortunate for the country's wel-

fare that the use of liquid chlorine was developed at this time.

The first to use liquid chlorine was Major Carl R. Dowall at Fort Meyer, and this was immediately followed by commercial experiments at Niagara Falls, Wilmington, Dela., Philadelphia and Brooklyn, by several investigators operating independently. Much difficulty was encountered in controlling the gas, the progress in development of an efficient equipment passing through the several stages of:

1. Plain iron pipe filled with gravel, a measured supply of water entering the top and gas being delivered from cylinders weighed on scales.

2. Pressure-regulating valve control of chlorine pressure entering the absorption tower and ultimate measurement of chlorine water by means of a standard orifice box.

3. The later use of compensating regulating valve, orifice, and hydraulic manometer to indicate rate of gas feed. Chlorine mixed with water in an absorption jar.

4. The latest improvement, involving only compensator, indicating gauge, and water-operated injector for mixing gas and water.

The rapid growth of the use of liquid chlorine was even more pronounced than that of hypochlorite. In 1912 only one water plant, that at Niagara Falls, was equipped with liquid chlorine apparatus, but the number at the end of 1918 had reached approximately 2,500. The greatest number of plants so equipped are undoubtedly found in the more populous urban districts, particularly those in states whose boards of health are most active and efficient in their work.

The United States census figures show that in 1917 the typhoid fever death rate in the registration area, which contained a population of 41,758,000, was 30.3 per 100,000; and the estimated number of typhoid deaths in that year throughout the entire country was approximately 30,000. In 1907 there were no chlorinated water supplies. The latest figures available from the U. S. Public Health Service are those for 1917, and at this time the rate had dropped to 12.3 per 100,000, with the estimated number of typhoid deaths stated as 13,000; and in this year there were at least 2,000 public water supplies that were chlorinated. This indicates a saving of 17,000 typhoid deaths per year, to say nothing of other water-born diseases or an increase in vital resistance to other diseases as claimed by the Hazen theory. Apparently the chlorination of water has been the major factor in saving more lives in the United States during the ten years since its inception than were lost by the United States forces in the world war.

If we value a life at $7,500, this figure including allowance for lost wages, medical attendance, lowered vitality, etc., in the proportionate number of typhoid illnesses there results a saving of over $125,000,000 annually.

The figures available represent the mortality statistics of only the so-called registration area, the estimated population of which is approximately seventy million, leaving forty million for which there are no statistics. A careful investigation made a few years ago indicated that the total number of public water supplies in the United States was something more than 7,500. The 2,500 supplies that have been filtered or chlorinated are but one-third of this number, and the other two-thirds supply the smaller cities in the less populous districts. If all of the water supplies serve the total urban population of sixty million, and the number receiving chlorinated or filtered water is forty million, according to the best estimate obtainable, this leaves a balance of twenty million, the major portion of whose lives are more or less endangered by the failure of the authorities to chlorinate the water.

It is obviously unfair to take the typhoid statistics of the total registration area as a basis for computing figures on water treatment, since these figures include the death rates of rural districts as well as of cities. In order to obtain an idea of the effect of chlorination on the urban typhoid statistics, the figures for 57 principal cities have been compiled from statistics of the Journal of the American Medical Association. These show that the average typhoid rate in these cities in 1908 was 28, while in 1918 the rate had dropped to 6.2.

If, however, we assume that the death rate in those municipalities not receiving purified water approximates even the low average condition existing in the total registration area in 1917, the annual loss of life in the twenty million urban population is not less than 2,500. This represents a loss annually of $18,750,000, which is six per cent on $312,500,000. The cost of installing five thousand additional chlorination plants would certainly not exceed $3,000,000, and the interest, depreciation and operation charges would not exceed $750,000. Compare this with the annual loss in vital capital.

It has been stated that the chlorination of public water supplies is the cheapest municipal insurance that can be obtained. For a municipality of five thousand or less the annual expense to the municipal government would be about $36.50 for operating, and $120 for depreciation at the rate of 20 per cent, or a cost of three cents per capita if the population is 5,000.

If we take the four principal states in the metropolitan area, New York, New Jersey, Pennsylvania and Connecticut, we find the following facts:

In New York in 1908 the death date was 16 and in 1918 it had fallen to 5.4; approximately 1,200 less deaths a year from typhoid. There are in the state 510 public water supplies serving a population of 8,700,000 out of a total population of 10,682,000; 125 of the supplies are either filtered or chlorinated or both, these serving 7,000,000, and leaving 1,700,000 served by 385 supplies whose water is not properly protected, giving an average of 4,400 population to each such supply.

In Pennsylvania the total rate in 1908 was 32.4 and in 1918 had fallen to 10. Out of a total population of 8,750,000 in the state, less than 4,000,000 receive purified water; and less than 140 out of a total number of supplies of 1,200.

In Connecticut only 24 supplies out of 104 are being treated today, but the death rate has fallen from 18.4 in 1908 to 5.3 in 1918.

New Jersey lost 408 of its citizens from typhoid in 1906, but reduced this loss to 162 in 1918. However, out of a total of 184 surface water supplies (69 underground supplies being eliminated), only 36 are chlorinated.

The writer presented two charts, one showing the reduction in Philadelphia, Baltimore, Pittsburgh, Cincinnati and Minneapolis, in which cities the water is both filtered and chlorinated, and the other showing the reduction in New York, Jersey City, Buffalo, Chicago and Milwaukee, in which the water receives no treatment except chlorination. The writer's purpose was to show that, so far as reduction in typhoid mortality goes, chlorination is quite as effective as filtration. "It is not, however, the writer's intention to create the impression that chlorination is to be in the slightest way considered as a substitute for filtration. There are today no doubt many chlorinated water supplies that should be filtered. The use of chlorine does not in any way change the physical or chemical characteristics of the water. It will not rectify the water from the standpoint of appearance, as it will remove neither turbidity nor other suspended matter and its effect upon color is almost negligible. The

important point, however, is its known bactericidal action and the absolute safety of the treated water for drinking purposes."

But while chlorination is not a substitute for filtration, neither should filtration be considered a substitute for chlorination. Dangerous bacteria remaining in the filtered effluent should be destroyed by chlorine and the water rendered sterile.

SANITATION AND MUNICIPAL DEATH RATES*.

Personal Precautions, Board of Health Work and Sanitation Compared—Development of Municipal Sanitation—Cost and Results.

By GEORGE A. SOPER, Ph.D.†

If we take up a consideration of the ways in which communicable diseases of different types have been combatted, we will note that there have been three general fields of effort. It is necessary to consider them all in order that the field occupied by sanitation may be viewed in its proper relations.

SANITATION COMPARED WITH OTHER HEALTH MEASURES.

The first may be called the field of personal precautions. Whether the effort is made in the city or country, in the tropics or temperate zones, in highly civilized countries or in the remote parts of the world, the essential elements of these precautions are the same. The reason for this is that they are based on purely personal instinct—purely personal experience—and little else.

Every one exercises certain precautions, consciously or unconsciously. They are a part of the education which we get in the school of experience. We learn to avoid the presence of the infectious sick and such common causes of illness as undue exposure, excessive fatigue and improper food.

The second field of effort in the control of disease is board of health work. The intention here is for the government, national, state and municipal, to exercise a wholesome supervision over the public health. This is done by the enforcement of laws and ordinances which relate to the collection of statistical and other data to indicate the birth and death rates and the prevalence of infectious and other causes of death. To attain their greatest value vital statistics should record the cases as well as the deaths, but we have not yet reached that point of development where the importance of this matter is generally appreciated.

Board of health work includes, beside the collection, tabulation, interpretation and publication of statistical facts relating to population, sickness and death, the supervision of food and drugs, the regulation of quarantine, the performance of vaccination and inoculation for the prevention of disease, the distribution of curative sera, and the sanitary education of the public through bulletins, lectures, reports and other methods of publicity. Education as a means of reducing the death rates is one of the most promising of all public health measures, but so far it is in its infancy.

The third great field of effort is that of sanitation. Sanitation is mentioned last here although it is, in point of fact, the most important. It is preeminent for a number of reasons.

By sanitation is meant that branch of systematic health work which requires plant and a force to maintain it. Examples are works for the procurement and distribution of wholesome drinking water, the collection and disposal of liquid sewage and the gathering and final disposition of kitchen waste, ashes and other discarded material. These are obviously sanitary undertakings but the list of improvements which go to make a city sanitary does not end here. Broad, well paved market places; suitable playgrounds; bright, well ventilated schoolhouses; in short, whatever the city has in the way of plant which goes to prevent the injuries to health which result from too densely segregated masses of people might properly be comprised under the head of sanitation; but in every-day parlance they are not so included.

Yielding to works of sanitation are not only typhoid, dysentery, and other diarrheal diseases, but many other forms of sickness. To introduce a public supply of pure water in place of a polluted one, or to build a sewerage system in a town which has had no good way of disposing of excrement, is to reduce the prevalence of nearly every disease from which men suffer and die. Nothing that can be done is so certain to lessen the death rate.

It would be interesting to know exactly the extent to which sanitation decreases municipal death rates, but the effect cannot be stated in numerical figures. Municipalities which are so backward as not to possess good sanitary works are usually too backward to know how much preventable sickness and death they have. And unless we know the sickness and death rates before and after the introduction of a sanitary improvement it is impossible to say precisely how great the benefit is.

Sanitary works possess a number of advantages as compared with other measures for the prevention of disease. For one thing, they do not require as high a degree of skill in their administration as do boards of health. For another, they have an advantage over personal precautions in not being individual in application and unco-ordinated in action. Sanitary works have a wholesale application. A water supply which is pure is wholesome for every person who has occasion to use it. The street that is well paved and kept clean is of advantage to every one who travels over it by vehicle or foot. And sanitary works do not hide their merits under a bushel. Their good effects are in plain sight—a constant recommendation of the good sense of those who are responsible for the welfare of the community.

HOW THE SANITARY DEVELOPMENT OF THE MODERN CITY HAS BEEN ACCOMPLISHED.

To trace the progress of sanitation in Europe and North America is an instructive undertaking for this history contains many useful lessons. In both continents a deliberate intention exists to regulate the growth of cities along lines which make for order, convenience, comfort, safety, health and beauty. From the first, sanitation has been a feature of many American cities. Sanitation, although long delayed, when it came, came like a revolution to the continental cities of Europe.

The beginnings of municipal sanitation everywhere are due to European initiative. Public water supplies, as we know them today, and sewers to carry away the most offensive and dangerous part of a city's filth, are a recent European contrivance. Street lighting, good pavements, adequate transportation, tenement house reforms, the construction of parks and playgrounds, the regulation of vehicular travel and street paving and cleaning have been developed more recently. The American city which ignores foreign practice in these directions fails to take account of experience which can save it a great deal of money.

The sanitary regeneration which European cities have

*Paper before Second Pan-American Commercial Conference, June, 1919.

†Major, Sanitary Corps, U. S. A.

experienced has had no counterpart in the United States. There has been no necessity for such revolutionary changes. American cities were small when the world began to learn that sanitation was an indispensable feature of every municipality. There was never such overcrowding, such slums to clean, such foci of filth to clear up and eliminate, as existed abroad half a century ago. In 1860 there were only sixteen cities in the United States with a population of 50,000 or more, as against one hundred and forty-eight in Europe.

The significant feature of municipal growth in America as compared with that in Europe has been less the reconstruction of cities already large than the construction of a great number of small cities. Hundreds of these have passed and are now passing through their periods of infancy, youth and adolescence toward a maturity which foreign cities attained long ago. Their sanitation takes place as they grow.

The first important sanitary improvement to be made in the growing village is the public water supply. This leads to the use of water closets and, to accommodate the drainage from these, cess-pools are built. The privies, the original provision for the disposal of excrement, are then eliminated. Street pavements are presently considered and the cleaning of the pavement and the collection of house refuse by municipal effort follow. At first garbage is collected by scavengers at the private expense of the householders; later it is done at public expense. The young city may now be said to have passed through its period of infancy and entered that of youth.

A sewerage system is built later in the city's growth. During this period the houses are gradually built closer to one another and in a more permanent form of construction until they stand in a compact mass. More attention is given now to pavements and to the cleaning of them. Parks are laid out, lighting is improved, ordinances are passed regulating many sanitary matters. The city has now reached its period of adolescence.

The period of maturity, that is the period in which civic responsibility begins fully to express itself, comes last. The regulation of building construction, the control of traffic and the adoption of farsighted plans to insure public health and safety are often taken up at this time. They should have been considered at a much earlier period. It is always easier to carry out a plan which has been made before-hand than one which has had to be prepared after permanent constructions and settled procedures have for some time been in existence.

HOW TO GET BETTER SANITATION.

It is instructive to observe how often it is that a community owes its sanitary improvements to its business men. It might be supposed that the principles of sanitation were more within the grasp of professional men than of those whose attention was chiefly occupied with manufacture and trade, and that doctors and lawyers and ministers would be foremost to see that the health and welfare of the public were properly looked after. This is not, however, always the fact. There is no disposition to belittle the help which professional men can give, but an experience in public work which covers many years and extends over many cities and states shows that when it comes to municipal improvements, it is the commercial element which usually exercises both the initiating and sustaining influence.

The explanation of this is simple enough. The general subject of sanitation is not so complicated as to be the exclusive province of any class or profession. Certainly the need of sanitation and the benefits of it can be understood by every intelligent person. Business men are accustomed to weigh returns against expenditures and readily appreciate that sanitation is a sound investment. Moreover they are accustomed to action and when they get together to obtain action for the public welfare they are apt to get it.

Often the important thing to know is what to do in order to improve the sanitation of a city. Why is the death rate high? What should be done to reduce it under the particular circumstances which exist? In answering these questions many technical and financial details may have to be considered. This is properly the work of experts. An unprejudiced expert should be called on to make a report based on a study of the local situation and on a knowledge of what other cities have done and are doing under similar circumstances. This report should serve as a program behind which the solid common sense of the municipality can array itself.

When a city needs a health program, as every city does, the best way to get it is for the business men to demand it of the municipal administration through their commercial organizations. If the municipality does not possess the talent for the work, an expert should be called in from outside. In many cases commercial organizations have themselves employed experts to make investigations and reports, to serve as a guide to the citizens in demanding what is proper.

The question is often asked, what can a city afford to spend for sanitation? The answer is that it can afford to spend whatever is necessary in order to make it healthy. If it is already healthy, it need spend but little; if it is unhealthy, it must, of course, spend more. A city, like a man, must have health, if it is fully to realize its possibilities. Epidemics paralyze business, and a high death rate is a reflection upon the good business sense of a community. In many cases investments for sanitation should be looked upon as policies.

Every city and every village ought to have a program of development; a plan to build to, a settled scheme of construction to refer details to. This program should be prepared early, in order to keep the growth properly proportioned, and prevent the excessive development of some relatively unimportant features at the sacrifice of the essential. Paramount in such a scheme should be suitable provisions for health.

Although a considerable investment of capital has to be put into sanitary works, the maintenance charges are not excessive as compared with the administrative costs of hand labor, which is often used as a substitute to accomplish the same result. It must not be expected, however, that good sanitary works can be built or that they can be effectively operated without care. Skill and attention in design and construction and operation are indispensable to the best results.

Although no attempt will be made here to show what large investments are made by every up-to-date city for the purpose of sanitation, it may interest some to know what share of the total yearly outlay is devoted to this purpose by the cities of the United States.

Among the 219 cities of 30,000 or more population in the United States, for every ten dollars put out each year for all purposes of administrative effort, one dollar and ten cents on the average is expended for health and sanitation. The amount varies among the different cities, according to the natural advantages of the site with reference to water supply, drainage, kind of population and commercial and industrial conditions, and according to the foresight and business ability with which the work is planned and carried out. The percentage of the total yearly expenditure which is devoted to health and sanitation sometimes runs as high as twice the figure stated, and occasionally falls to about one-half of it. The size of the city does not affect the per cent.

NEWS OF THE SOCIETIES

Aug. 26-28.—LEAGUE OF CITIES OF THE THIRD CLASS IN PENNSYLVANIA. Twentieth annual convention, Allentown, Pa. Secretary, Fred H. Gates, city clerk, Wilkes-Barre, Pa.

Aug. 27-29.—VIRGINIA STATE FIREMEN'S ASSOCIATION. Thirty-third annual meeting, Charlottesville, Va. Secretary, E. K. Landis.

Oct. 27-30.—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting, New Orleans, La. Secretary, A. W. Hedrich, 169 Massachusetts ave., Boston, Mass.

Nov. 12-14.—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, Springfield, Ill.

American Association of Engineers.

The American Association of Engineers has granted a charter for a club to petitioners and members from Sacramento, Cal. It is expected that a local chapter will follow shortly. W. B. Carruthers was elected president, R. A. Bergman, vice-president, and H. A. Lathrop, secretary.

The Omaha, Neb., Chapter of the American Association of Engineers recently elected the following officers for the coming year: President, W. R. McKeen, president McKeen Motor Car Co.; first vice-president, J. H. Houghton, contract engineer, U. P. Co.; second vice-president, J. A. Bruce, city engineer, Omaha; secretary, E. Trimble, C. E. contract dept., U. P. Co.; treasurer, W. J. F. Sackriede, C. E., contract dept., U. P. Co. Board of Directors: A. C. Anderson, consult, mech. engr., Omaha; E. H. Hagensick, elect. engr., U. P. Co.; Capt. H. E. McClintock, asst. engr., city of Omaha; R. E. Savage, C. E., U. P. Co.

A permanent organization of the Portland, Ore., Chapter has been affected and the following officers elected: President, W. H. Marsh; first vice-president, A. H. McKeen; second vice-president, T. W. Saul; third vice-president, O. Laurgaard; secretary, R. W. Barnes; treasurer, C. F. Thomas.

A committee of the Oregon Society of Engineers has been appointed by its executive board to work out detail plans for amalgamation with the American Association. Tentative plan has been drawn and was submitted to the national board of directors of A. A. E.

A petition has been received for an Oklahoma Chapter, signed by 44 prominent engineers at Oklahoma City. The officers are: President, Fred L. Verity, asst. div. engr., M. K. & T. R. R., and secretary, Erle K Ramsey, office engineer, city of Oklahoma. C. E. Drayer, the national secretary of A. A. E., spoke at a meeting of the Oklahoma Chapter on June 2 and installed its charter.

A charter has been granted to the Charlotte, N. C., Club of the American Association of Engineers. J. A. Killian, res. engr. of the Southern Railway, has been elected president and G. T. Asbury, office engineer, Southern Railway, secretary. It is expected that a strong chapter will shortly follow.

The Dayton, Ohio, Club of the American Association of Engineers has been organized and the following officers elected: President, E. J. Correll; vice-president, G. Calvert; secretary, H. Gellin; treasurer, L. E. Ettinger.

The Municipal Section of the St. Louis Chapter of the American Association of Engineers has been organized with the following officers elected: E. Paffrath, chairman and George Grimm, Jr., secretary of the St. Louis Chapter, secretary. One vice-chairman will be elected from each of the five city departments.

Conference of Health Authorities.

The seventeenth annual Conference of State and Territorial Health Authorities with the Public Health Service was held on June 4 and 5, 1919, in Washington, D. C., with Surg. Gen. Rupert Blue in the chair. Forty-one states were represented at the conference.

The following resolution indorsing the principle of federal aid extension in rural sanitation, was unanimously adopted by the conference:

Resolved, that it is the sense of the conference of the United States Public Health Service with the state and territorial health authorities meeting in Washington, June 4 and 5, 1919, that on account of the greatly accentuated popular findings by draft boards of widespread physical impairment among millions of apparently healthy registrants, and because of the present pronounced restlessness of rural local governments for breaking away from their former attitude of indifference to adequate measures of human conservation and in undertaking with or without the guidance of experienced health agencies, hastily prepared and varied programs of rural health work, that the present moment is, of all times, the most opportune and crucial for federal and state health authorities to take steps for assisting local rural governments in the development of an economic, efficient and permanent system of rural health work; and,

Be it further resolved, that it is the sense of this conference that the best means for insuring the future of rural health work is the federal aid extension principle of government (the wisdom and practicability of which has been demonstrated and established in providing for other rural needs, as in the matter of post roads, vocational education, and farm life demonstration work), as represented in H. R. 2845 recently introduced in the present Congress and entitled "The Rural Health Act."

The conference dealt primarily with questions involving the reorganization of public health activities following the war. Among the subjects which were taken up were malaria, child hygiene, problems in interstate health work, control of venereal diseases, public health education, the Sanitary Reserve Corps of the Public Health Service, railroad sanitation, and statistics relating to the 1920 census. Standing committees on morbidity returns, sanitation of public conveyances, rural sanitation and trachoma, made their reports, and a special progress report was made by directing zoologist (reserve) C. W. Stiles, chairman of a commission appointed by the Surgeon General to study the problem of sanitary disposal of human excreta in unsewered communities.

Among the interesting features of the conference, were addresses by judge J. H. Moyle, Assistant Secretary of the Treasury, in charge of the Public Health Service, Col. W. H. Welch a representative of the Public Health Service at the recent conference o. Red Cross societies held at Cannes, France, and Dr. D. Z. Dunott, chairman of the committee on health and medical relief of the United States Railroad Administration.

Reports from the following standing committees were received: Morbidity Returns, Dr. Eugene R. Kelley; Sanitation of Public Conveyances, Dr. Oscar Dowling; Rural Sanitation, Dr. W. S. Rankin; Trachoma, Dr. John McMullen.

A progress report of the commission appointed by the Surgeon General to study the problem of sanitary disposal of human excreta in unsewered communities was presented by Prof. C. W. Stiles.

Other subjects taken up were:

Malaria: "Its Importance—National and State Problems Involved," "Necessity of Co-operative Plan of Attack Between Federal and State Governments."

Child Hygiene: "Necessity for a Nation-Wide Program of Child Hygiene by Co-operative Work Between the Federal and State Governments."

Statement by Col. W. H. Welch on League and Red Cross Societies.

Problems in Interstate Health Work: "Control of Water Supplies Used in Interstate Traffic." "Control of Interstate Spread of Disease."

Public Health Education—Program for co-operation with States.

The Sanitary Reserve Corps of the Public Health Service: "Discussion of Best Methods of Organization and Usage, with Particular Reference to State Health Departments."

Problems of Railroad Sanitation.

Statistics, 1920 Census.

Control of Venereal Diseases as a National Problem.

General Engineering Congress.

Arrangements have been made for a general engineering congress to be held in Batavia, Java, in May, 1920. It will deal with harbors and means of communication (including railways, tramways, telegraphy, and telephony); irrigation, drainage, waterworks, etc.; roads and bridges, town planning, architecture, etc.; the production of energy, electricity, and industries (including ironworks, factories and agricultural industries); mining and geology. It will deal with other subjects also, such as technical education, labor questions, building materials, and aerial navigation. Invitations have been issued to engineers bordering on the Pacific and Indian Oceans. The

(*Continued on page* 12)

INDUSTRIAL NEWS

Well-Known Engineers on Asphalt Association Staff.

Foremost federal, state and municipal engineers are included in the newly formed staff of the Asphalt Association, whose headquarters have been established at 15 Maiden Lane, New York City, under the direction of J. E. Pennybacker, the secretary. There will be a research and technical department managed by Prevost Hubbard, chief of the research and testing division of the United States Bureau of Public Roads prior to his affiliation with the association. Mr. Hubbard is one of the leading authorities in the United States on research work in all classes of bituminous materials and is the author of standard text-books on the subject.

Field engineers who will devote their attention to aiding state, country and municipal authorities in the working out of their highway problems, include Fred W. Sarr, who was deputy state highway commissioner of New York in charge of the maintenance, repair and reconstruction of all state and county highways comprised in New York's system. He has especially studied the questions of durability of types of highways, the service conditions which highways must withstand, and the relative cost of capital outlay and upkeep of all types of highways.

A. T. Rhodes, for years street commissioner of Worcester, Mass., and later secretary of the Granite Paving Block Manufacturers' Association, and who is vice president of the Massachusetts Highway Association, will look after the New England territory and other eastern points. Mr. Rhodes' practical experiences included the design and installation of the city asphalt plant at Worcester and the construction of the asphalt pavements of that city.

At the Chicago office of the association, J. B. Hittell, formerly city engineer of Chicago and president of the Illinois Society of Engineers, will be in charge of the work in the middle western states.

Shortly a branch office will be established in Atlanta and at other points and announcements will be made of the engineers selected for the various posts.

Saving the many thousand miles of waterbound macadam roads on main routes of travel by economically utilizing the existing surfaces for foundations will be an important field for the efforts of the association's engineers. The utilization of local materials to the fullest extent in combination with asphalt so as to cut down freight costs on imported materials, will be another phase of construction to be given close attention by the association. Improvement in methods, speeding up of deliveries, betterment of product, aiding the working out of thorough inspection facilities, obtaining and giving out useful data to the public officials and contractors will form some of the other lines of activity of the organization.

The Sullivan Machinery Co., Chicago, is pleased to announce the establishment of a new branch office at room 810, Park Building, Cleveland, Ohio, under the management of Ralph T. Stone, for several years past, sales engineer associated with the New York office of this company.

O. S. Tweedy, who has been prominently associated with the tire industry, for the past twenty years, formerly with the Diamond Rubber Company, and during the past ten years with the United States Tire Co., who resigned from that position to accept a position as vice president with the L. A. Young Industries, Inc., Detroit, Michigan, has decided to return to the tire business in the capacity of vice president for the **Dryden Rubber Company,** of Chicago.

Well-Known Pipe Foundries Merged.

The Iron Products Corporation, New York, recently incorporated in Delaware with capital of $3,000,000, has established offices at 90 West street. Plans have been perfected for the merger of the **Essex Foundry**, Murray Street, Newark, N. J., and the **Central Foundry Co.,** with works at Newark, Baltimore, Medina, N. Y.; Vincennes, Ind.; Anniston, Bessemer and Holt, Ala., with the new company. The Essex Foundry has specialized in the manufacture of cast-iron pipe steam and kindred products, while the Central Foundry Co. has been producing similar pipe products, cast-iron fittings and general castings. It is proposed to arrange for an immediate operating capital of $1,000,000. Mr. Harder, head of the Essex Foundry, will become president of the corporation; Bayard H. Faulkner is secretary.

The Blaw-Knox Company, Pittsburgh, Pa., is to move its Wheatland, Pa., plant to Hoboken, N. J., where it has large interests. The work of dismantling is now in progress. The site and buildings have been bought by the Sharon Steel Mfg. Co. The building of an extension to the Hoboken plant, the Blaw-Knox Co. says, is being done for the purpose of concentrating all manufacturing at Hoboken, which has been found an advantageous point for manufacturing and shipping facilities. About half the new plant at Hoboken has been completed, and it is anticipated the entire addition will be finished within the next few weeks. The combined plants at Hoboken now under construction will contain about 30 per cent. more floor space than was available in the two separate plants. The capacity of the enlarged plant at Hoboken for the manufacture of its products will be proportionately increased. In addition to the above, the Blaw-Knox Co. is building a welding plant at Hoboken adjoining its present plant, and will specialize in this department on steel mill and chemical plant specialties. The combined plants at Hoboken will employ about 1,200 men, as against 700 men employed by the company heretofore at Hoboken and Wheatland. The manufacturing site at Hoboken covers 50 acres. In order to take care of the additional labor required, the company has purchased 15 acres of additional ground, on which houses are being erected for the use of its workmen. The Blaw-Knox Co. manufactures steel plate and special forgings, its forms for concrete sidewalk, pavement, sewer and conduit construction being widely known.

PERSONALS

Rhodes, Frederick A., consulting engineer, San Diego, Cal., is now city engineer.

Turner, H. E., formerly assistant division engineer, Denver & Rio Grande Ry., Utah Lines, is now resident engineer in charge of concrete-highway construction, state road commission of Utah.

Allen, H. C., state highway engineer of Idaho, died at Sprague, Wash., recently. He was appointed to the position of state highway engineer a year and a half ago. Previously he was city engineer of Great Falls, Mont., and practiced as a mining and irrigation engineer.

Hoffman, Fred, contractor and engineer of Long Beach, Cal., has been appointed city engineer.

Towse, A. R., has been elected county engineer of Pensacola, Fla.

Miller, Lieut. H. E., formerly Construction Division, U. S. A., has been appointed director of the bureau of engineering and inspection, North Carolina State Board of Health, with headquarters in Raleigh.

Conrad, Harry, of the firm of Coulter & Conrad, engineers, Wheeling, W. Va., has been appointed city engineer of Wheeling, succeeding Charles C. Cook, who resigned.

NEWS OF THE SOCIETIES

(*Continued from page* 11)

main object is to influence the technical development of eastern Asia.

The proceedings will be conducted in Dutch and English, and it is expected that this congress in Batavia will do much toward solving technical problems, as well as toward assisting in the development of the pan-Pacific movement by the opening up of new routes and the consequent extension of trade and the dissemination of information.

The address of the secretary of the congress is Kebon Sirih 56, Batavia, Java, Netherlands, India.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION
BIDS ASKED FOR

CONTRACTS AWARDED
ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STREETS AND ROADS.

Ala., Guntersville. July 8.
Grading, draining and surfacing with macadam 5,60 mi. road in Marshall Co.—W. S. Keller, State Hwy. Engr., Montgomery.

Ala., Mobile. July 14.
Two and a half mi. bitulithic paving and 2½ mi. rock asphaltic paving.—T. B. Allman, Clk., Bd. Co. Comrs.

Ark., Fayetteville. 2 p.m., July 8.
Fifty-two mi. gravel and limestone macadam road, involving 11.5 acres clearing and grubbing; 155,282 cu. yd. excavation; 5,000 cu. yd. rock excavation; 20 mi. grading machine work; heavy and light steel bridges; 33,752 cu. yd. field stone base; 26,660 cu. yd. native gravel; 16,138 cu. yd. limestone top course; plain and reinforced concrete; 1,968 lin. ft. 15 to 30-in. concrete pipe, 20,000 sq. yd. scarifying and reshaping old macadam, and 24,794 sq. yd. bituminous macadam, 2-in. top.—Hamilton & Shreve, Engrs.

Del., Dover. 2 p.m., July 9.
8.27 mi. state highway of cement concrete in New Castle and Kent counties, involving 8.5 acres clearing and grubbing; 98,500 cu. yd. grading; 1,200 lin. ft. 15 to 36-in. reinforced concrete pipe; 3,500 lin. ft. guard rail; 1,675 tons stone for macadam; 600 sq. yd. penetration macadam; 14,980 cu. yd. cement concrete roadway; 400 joints; 2,000 sq. yd. roadway reinforcement, etc.—C. M. Upham, Chief Engr., State Hwy. Dept.

Fla., Bronson. July 8.
Highway in Levy Co.—F. Thomas, Engr., Gainesville.

Fla., Gainesville. July 8.
46,000 sq. yd. limestone surfacing, 13,000 cu. yd. grading and 18 acres clearing and grubbing in Levy Co.—Co. Bd. Comrs.

Fla., Tallahassee. 11 a.m., July 9.
11.73 mi. monolithic brick, grouted brick on sand base with concrete curb, bituminous macadam or two-course plain concrete pavement in Alachua Co., and six mi. similar pavement in Santa Rosa Co.—Wm. F. Cocke, Comr., State Rd. Dept.

Ga., Rome. 2 p.m., July 22.
Seven mi. road through Floyd Co., including drains, culverts, etc., involving 15,687.5 cu. yd. earth excavation, 13,124.8 cu. yd. borrow excavation, 20,080.3 cu. yd. top soil surfacing, 472.5 lin. ft. 12 to 24-in. D. S. citr. clay pipe, etc.—J. B. McCrary Co., Engrs., Third Natl. Bank Bldg., Atlanta.

Ill., Springfield. 10 a.m., July 9.
45,995 ft. concr. or monolithic brick (4-in.) pavements in Sangamon Co.; 157,410 ft. roads of Portland cement concr., monolithic 4-in. and 3-in. brick, or bituminous concr. with or without binder course, in Fayette and Bond Cos.; 19,457.3 ft. concr. roads in Lee, Madison, Morgan and Stephenson Cos.; 3,100 ft. brick road in Ford Co.; 26,213.2 ft. earth roads in Jo Daviess and Mercer Cos.; 3,390.4 ft. repair work on gravel road in Kane Co.; 49,613.4 ft. earth roads in Sangomon, Tazewell and Union Cos., and 4 bridges in Effingham Co.—C. Older, Chf. Hwy. Engr., Dept. Pub. Wks. and Bldgs., Div. of Hways.

Ill., Springfield. 10 a.m., July 9.
22,459 ft. earth road and culverts in Effingham Co. and 4,678 ft. pavement in Mason Co.—C. Older, Chief Hwy. Engr., Dept. Pub. Wks. and Bldgs., Div. of Hwys.

Ind., Indianapolis. July 15.
Improving 46.34 mi. state roads with plain concr., monolithic brick or bituminous concr.—State Hwy. Comn.

Ind., Princeton. 10 a.m., July 12.
Three stone and gravel roads in Patoka Twp.—J. H. Armstrong, Co. Aud.

Ind., Indianapolis. 10 a.m., July 22.
Gravel road on line between Pike and Washington Twps.—L. K. Fesler, Co. Aud.

Ind., Danville. 2.15 p.m., July 11.
Improving roads in Washington, Union, Middle, Marion, Lincoln, Union, Liberty, Franklin and Center twps.—C. M. Havens, Co. Aud.

Ind., Shelbyville. 10 a.m., July 23.
10,600 ft. gravel road on line between Shelby and Hancock Cos.—F. W. Fagel, Co. Aud.

Ind., Rockville. 1 p.m., July 8.
3,823 ft. gravel road in Howard and Green Twps. and 1¼ mi. gravel road in Penn Twp.—R. E Porter, Co. Aud.

Ind., Frankfort. 2 p.m., July 8.
Five gravel roads in Center, Union, Johnson, and on line between Union and Ross Twps.—E. Spray, Co. Aud.

Ind., Martinsville. 2 p.m., July 8.
Stone road in Ashland Twp., three gravel roads in Clay, Gregg and Monroe Twps., and two crushed stone roads in Adams Twp.—H. H. Nutter, Co. Aud.

Ind., Salem. 1.30 p. m., July 8.
Four roads in Washington and Posey Twps., aggregating 36,503 ft.—E. E. Batt, Co. Aud.

Ind., Muncie. 10 a.m., July 8.
Gravel road in Perry Twp .and 7,525 lin. ft. bituminous macadam road in Union Twp.—J. P. Dragoo, Co. Aud.

Ind., Sullivan. noon, July 8.
Three gravel roads in Turman, Jackson and Haddon Twps., two concrete roads in Hamilton Twp. and two macadam roads in Jefferson and Gill Twps.—F. M. Danels, Co. Aud.

Ind., Huntington. 10 a.m., July 8.
Four roads in Jackson and Clear Creek Twps.—O. E. Eviston, Co. Aud.

Ind., Rochester. 2 p.m., July 8.
Brick road in Rochester Twp.—E. A. Smith, Co. Aud.

Ind., Madison. 1 p.m., July 8.
Gravel road in Graham Twp.—C. S. Dibler, Co. Aud.

Ind., Corydon. 2 p.m., July 8.
Stone road in Washington Twp.—S. C. Mauck, Co. Aud.

Ind., Lebanon. 10 a.m., July 8.
Two gravel roads in Center and Jefferson Twps.—C. Goodwin Co. Aud.

Ind., Lawrenceburg. 10 a.m., July 8.
10,264.5 ft. broken stone road in Washington Twp.—A. E. Jackson, Co. Aud.

Ind., Monticello. 10 a.m., July 8.
Three crushed stone roads in Monon, Union and Honey Creek Twps. and one gravel road in Prairie Twp.—F. E. Vinson, Co. Aud.

Ind., Decatur. 10 a.m., July 8.
Four crushed stone roads in Monroe and French, Washington and Monroe Twps.—J. Mosure, Co. Aud.

Ind., Indianapolis. 10 a.m., July 18.
34,942 ft. reinforced concrete roads in Marion Co.—L. K. Fesler, Co. Aud.

Ind., Bloomfield. 2 p.m., July 8.
Two macadam roads in Grant and Stockton and Highland Twps.—H. Corbin, Co. Aud.

Ind., Columbia City. noon, July 8.
Completing road in Smith Twp.—W. K. Burwell, Co. Aud.

Ind., Winamac. noon, July 8.
Three mi. gravel road in Van Buren Twp., 2⅞ mi. gravel road in Jefferson, White Post, Salem and Beaver Twps., 15,817 ft. crushed stone road in Salem Twp. and three mi. gravel road on line between Indian Creek and Van Buren Twps.—J. C. Howe, Co. Aud.

Ind., Decatur. 10 a.m., July 9.
Crushed stone road in Washington Twp.—J. Mosure, Co. Aud.

Ind., Bedford. 1 p.m., July 8.
Four gravel or macadamized roads in Spice Valley, Perry and Marion Twps.—Wm. M. Denniston, Co. Aud.

Ind., Rochester. 2 p.m., July 8.
Brick road in Rochester Twp.—E. A. Smith, Co. Aud.

Ind., Valparaiso. 2 p.m., July 8.
2.48 mi. gravel road in Morgan Twp. and 1.76 mi. gravel road in Union Twp.—B. H. Kinne, Co. Aud.

Ind., Brazil. 10.30 a.m., July 8.
Limestone and gravel road in Sugar Ridge twp.; gravel road on line between Washington twp. Putnam Co., and Van Buren twp., Clay Co.—W. E. Parrish, Co. Aud.

Md., Baltimore, noon, July 9.
Grading, curbing and paving city streets, involving 24,580 sq. yd. sheet asphalt pavement, 13,940 lin. ft. armored concr. curb, 1,050 sq. yd. vitr. brick gutters and 22,000 cu. yd. grading.—J. H. Robinette, Pres., Comrs. for Opening Sts.

Minn., Blooming Prairie. 8 p.m., July 7.
13,032 sq. yd. street paving.—T. J. Cashman, Clerk.

Minn., Appleton. July 11.
30,000 sq. yd. pavement.—J. W. Shaffer & Co., 403 New York Life Bldg., Minneapolis.

Minn., Fairmont. 8 p.m., July 10.
Curbing, grading and paving various city streets.—E. L. Lewis, City Clerk.

Minn., Rochester. 2 p.m., July 15.
State road, involving 78,702 cu. yd. earth excav.; 6,898 cu. yd. sand rock excav.; 2,200 lin. ft. guard rail; 698 ft. 15 to 42-in. portable culverts, box culverts, etc.—L. J. Fiegel, Co. Aud.

Minn., Faribault. 2 p.m., July 16.
13 fed. id proj. No. 64, involving 107,148 cu. yd. excav.; 1,392 lin. ft. 15 to 24-in. portable culverts, 205 cu. yd. concr. for standard culverts, and 136,082 sq. yd. concr., asphalt concr., or brick pavement.—F. M. Kaisersatt, Co. Aud.

Minn., Red Wing. 1:30 p.m., July 17.
Graveling 21.25 mi. road; also rein. concr. span bridge.—C. H. Meyer, Co. Aud.

Minn., Brainerd. 3 p.m., July 19.
21 mi. fed. aid proj. No. 51, involving 100 acres clearing and grubbing, 140,000 cu. yd. grading, 20,000 cu. yd. overhaul, 7,000 lin. ft. guard rail, 500 lin. ft. tile drain, 2,275 lin. ft. 12 to 24-in. portable culverts, 101,600 lin. ft. shaping and compacting, 5 concr. box culverts, 3 rein. concr. bridges, etc.—C. W. Mahlum, Co. Aud.

Minn., Grand Rapids, 10 a.m., July 14.
8.95 mi. fed. aid proj. No. 52, involving 54 acres clearing, 44 acres grubbing, 36,300 cu. yd. excav., 1,320 cu. yd. hand ditching, 960 lin. ft. sectional concr. culverts (12 to 36-in.), 3,775 lin. ft. guard rail, 10,500 cu. yd. gravel surfacing, etc.—T. Erskine, Co. Aud.

Minn., Worthington. 2 p.m., July 14.
5.5 mi. fed. aid proj. No. 58, involving 15,304 cu. yd. excav., 58,340 sq. yd. pavement and 30,000 lin. ft. 6-in. tile.—G. Swanberg, Co. Aud.

BIDS ASKED FOR

Minn., Duluth. **11 a.m., July 22.**
Paving street.—J. A. Farrell, Comr. Pub. Wks.

Minn., Pipestone. **1.30 p.m., July 8.**
State road, involving 33,951 cu. yd. grading, 13,082 cu. yd. side excavation, 76,500 cu. yd. overhaul, 12,166 cu. yd. graveling, etc.; also state road involving 27,392 cu. yd. graveling, etc.—T. A. Bailey, Co. Aud.

Minn., Ivanhoe. **10 a.m., July 14.**
State roads, involving 9,185 cu. yd. graveling, haul from one-half to 3½ mi., etc.—A. L. Swenson, Co. Aud.

Minn., Cambridge. **10 a.m., July 14.**
Furnishing 7,000 cu. yd. road gravel, delivered at Minneapolis.—F. A. Norell, Co. Aud.

Miss., Columbus. **10 a.m., July 14.**
5.4 mi. Federal Aid Project No. 28, involving four acres clearing and grubbing, 24,000 cu. yd. grading, 8,400 cu. yd. gravel, 220 cu. yd. concrete, 125 lin. ft. culvert pipe, 5.4 mi. sodding and one 130 and one 140-ft. concrete bridge.—X. A. Kramer, Chief Hwy. Engr., State Hwy. Dept., Jackson.

Mo., St. Louis. **noon, July 25.**
Paving 1,038 ft. roadway with bitulithic, 30 ft. wide, and constructing curb.—W. W. Horner, City Engr.

Mo., St. Louis. **noon, July 8.**
Improving city streets with bituminous macadam and concrete curb and with vitrified brick and granite curb; reconstructing intersections of streets with treated wood block pavement.—E. R. Kinsey, Bd. Pub. Serv.

Mo., St. Louis. **noon, July 15.**
Reconstructing street with treated wood block pavement and granite curb; improving three streets with bitulithic pavement and granite or concrete curb. —E. R. Kinsey, Pres., Bd. Pub. Serv.

Neb., Omaha. **July 8.**
Paving various streets and constructing curb or combination curb and gutter.—J. A. Bruce, City Engr.

N. J., Trenton. **10.30 a.m., July 14.**
Repairing 14,000 ft. road in Woodbridge Twp. with bituminous dressing.—A. L. Grover, Chief Clk., State Hwy. Comn.

N. J., New Brunswick. **10 a.m., July 10.**
Paving five streets with vitrified brick, asphalt block, warrenite on concrete base, concrete, sheet asphalt or asphaltic concrete; bluestone or concrete curbing, etc.—City Engr., City Hall.

N. J., Woodstown. **7.30 p.m., July 7.**
27,475 sq. yd. surface pavement on repaired bituminous concrete foundation.—Keasbey & Sparks, Engrs., Mecum Bldg., Salem.

N. J., Roselle. **8.30 p.m., July 7.**
Paving street, involving 3,492 sq. yd. 6-in. macadam and 553 cu. yd. excavation; also 1,887 lin. ft. 4-ft. concrete sidewalks.—W. H. Luster, Boro. Engr., 286 N. Broad St., Elizabeth.

N. J., Atlantic City. **11 a.m., July 9.**
Concrete gutters in town of Hammonton.—A. H. Nelson, Co. Engr., 636 Guarantee Trust Bldg.

N. J., Milltown. **2.30 p.m., July 10.**
Repairing street with warrenite surface on concrete foundation, involving 13,600 sq. yd. pavement.—A. B. Fox, Co. Engr., 175 Smith St., Perth Amboy.

N. J., Elizabeth. **2.30 p.m., July 27.**
Two roadway intersections of macadam or amiesite in Summit; 5,500 ft. bituminous concrete roadway on old and new macadam base in New Providence. —J. L. Bauer, Co. Engr., 120 Broad St.

N. J., Trenton. **10.30 a.m., July 9.**
45,692 sq. yd. concr. surface road in Morris Co., and 1,772 cu. yd. grading in Union Co.—A. L. Grover, Chf. Clk., State Hwy. Comn.

N. J., Trenton. **10.30 a.m., July 11.**
41,000 sq. yd. concr. surface road in Middlesex and Somerset Cos.—A. L. Grover, Chf. Clk., State Hwy. Comn.

N. Y., Niagara Falls. **10 a.m., July 9.**
Paving city streets, involving 4,295 sq. yd. pavement, 3,789 lin. ft. Medina curb, 3,789 lin. ft. drain tile, 8 new catch basins, resetting all existing catch basins, etc.—City Engr., Convention Hall.

N. Y., St. George, S. I. **noon, July 10.**
Repaving with bituminous macadam the space between track rails and 2 ft. outside inner rails, involving 22,650 sq. yd. pavement.—C. D. Van Name, Pres., Boro. of Richmond.

N. Y., Albany. **1 p.m., July 22.**
Improving highways, involving 25.24 mi. in Cattaraugus, Chautauqua, Chenango, Lewis, Onondaga, Rensselaer and Suffolk counties; also completing 84.01 mi. highways in Cayuga, Chautauqua, Chenango, Franklin, Niagara, Oswego, Saratoga and Seneca counties; also repairing three roads in Allegany, Schuyler and Steuben counties, Oswego and Suffolk counties; and completing road repair in Chenango and Cortland counties.—F. S. Greene, Comr. of Hwys.

N. Y., New York. **10.30 a.m., July 8.**
Repaving with sheet asphalt on concr. foundation.—H. Bruckner, Pres., Boro. of Bronx.

N. Y., St. George, S. I. **noon, July 7.**
Repairing roadway with wood block pavement, involving 700 sq. yd. new wood block pavement, 140 cu. yd. concrete foundation, etc.—C. D. Van Name, Pres., Boro. of Richmond.

N. Y., L. I. City. **11 a.m., July 7.**
Furnishing 6,500 cu. yd. sand and 80,000 hardwood paving blocks.—M. E. Connolly, Boro. of Queens.

N. Y., New York. **2 p.m., July 7.**
Repaving with sheet asphalt on existing stone foundation; repaving with granite block on concrete foundation on various city streets.—F. L. Dowling, Pres., Boro. of Manhattan.

N. Y., Waverly. **7 p.m., July 7.**
Improving street, involving 1,200 yd. excavation, 1,800 yds. compressed gravel pavement, 2,200 yds. reinforced concrete pavement, 1,400 ft. curb and gutter and 1,450 ft. concrete curb.—P. Kerrigan, Vil. Clk.

N. C., Kinston. **2.30 p.m., July 8.**
18,820 sq. yd. concrete sheet asphalt or warrenite pavement, 3,282 cu. yd. excav., 242 cu. yd. box culvert concrete on highway in Lenoir Co.—H. C. Hines, Secy. State Hwy. Comn., Raleigh.

N. C., Nashville. **11 a.m., July 8.**
1¼ mi. roadway, sidewalks and curbing.—L. T. Vaughan, Town Clk.

O., Columbus. **2 p.m., July 11.**
Three and a half mi. road in Erie Co., surface treatment with covering; improving 6.18 mi. highway in Delaware Co. with bituminous macadam or reinforced concrete pavement, bridges and culverts; improving roads in Wood and Medina counties.—C. Cowen, State Hwy. Comr.

O., Columbus. **July 8.**
Grading, draining, curbing and paving road.—W. J. Herman, Clk. Bd. Comrs.

O., St. Clairsville. **July 12.**
Road work in Colerain Twp.—E. N. Boggs, Chmn., Trustees.

Pa., Hollidaysburg. **7 p.m., July 14.**
Paving street with brick on 5-in. conc. base or 2-course rein. Conc., involving 5,300 sq. yd. paving, 2,500 cu. yd. excav., and 3,200 lin. ft. concr. curb. —J. L. Henry, Boro. Engr.

O., Cuyahoga Falls. **July 9.**
Curbing and paving street intersection and constructing lateral sewer.—City Engr.

O., Sandusky. **July 11.**
Tar surfacing 5.65 mi. roads.—State Hwy. Comn., Columbus.

O., South Euclid. **July 8.**
Improving road by constructing sidewalks and grading.—F. A. Pease Engr. Co., Marshall Bldg.

O., Cincinnati. **noon, July 14.**
Driveways and walks, athletic track and surface drainage in public school. —C. W. Handman, Business Mgr., Bd. Education.

O., Fremont. **July 9.**
3,703 sq. yd. brick pavement and 2,785 lin. ft. sandstone curbing.—City Engr.

O., Amherst. **July 20.**
Grading, paving and curbing various streets, involving 1,700 lin. ft. 4-in. brick paving, etc.—Warden & Laundon, Engrs., 400 Elyria Blk.

O., Springfield. **July 16.**
4,653 ft. wood or granite block pavement and sheet asphalt, bitulithic or brick pavement, involving 11,400 sq. yd. paving and 9,100 ft. concrete curb.—O. E. Carr, City Engr.

O., Wyoming. **July 7.**
Reconstructing curbs and gutters, intersections, entrances to driveways, etc., on road.—Vil. Engr.

O., Findlay. **July 5.**
Reconstructing roads in Amanda Twp. —J. C. Treece, Twp. Clerk.

O., Lima. **July 11.**
Repairing 25 roads with bituminous treatment on concr.—Co. Engr.

Ore., Portland. **July 8.**
28 mi. hwy. between Swenson and Clatskanie.—State Hwy. Comn.

Pa., Palmerton. **9 p.m., July 9.**
Street improvements, involving 12,830 cu. yd. excavation, 30,260 sq. yd. broken stone sub-base course, 30,260 sq. yd. cement concrete base course, 30,260 sq. yd. concrete, brick and amiesite pavement, 2,890 lin. ft. concrete curbing, renewing old curbing, etc.—Boro. Engr., Palmer Land Co., 3d and Delaware Ave.

Pa., Ebensburg. **10 a.m., July 14.**
Reconstructing 10¼ mi. hwy. in Croyle Twp., with 16-ft. roadway of vitr. brick paving block on combination concr. base and curb.—O. P. Thomas, Engr., Leader Bldg., Johnstown.

Pa., Shenandoah. **July 14.**
Paving 9,500 sq. yd. with wood block, vitr. brick, sheet asphalt, tarvia or other suitable paving material; also 3,177 sq. yd. asphalt covering on old Belgian block.—D. T. Glover, Boro. Engr.

Pa., Pittsburgh. **11 a.m., July 10.**
Two thousand ft. 16-ft. road in Reserve Twp. with telford macadam; 12 100-gal. asphalt heating kettles and 250 tons natural asphalt.—Co. Rd. Comr., Court House.

Pa., Harrisburg. **10 a.m., July 8.**
State road projects involving 109.96 mi. bituminous surface course, Hillside vitr. brick on concr. foundation, or rein. concr. pavement in Bradford, Bucks, Butler, Centre, Clearfield, Clinton, Delaware, Fayette, Lehigh, Luzerne, Somerset, Sullivan, Susquehanna, Tioga, Westmoreland, Wyoming, Lackawanna and York Cos., estimated cost $4,000,000 to $4,500,000.—L. S. Sadler, State Hwy. Comr.

Pa., Pottstown. **July 15.**
28,715 sq. yd. vitr. brick paving on concr. foundation.—M. L. Seasholtz, Boro. Clerk.

Pa., Pittsburgh. **11 a.m., July 10.**
2,000 ft. telford macadam roadway, 16 ft. wide, in Reserve Twp.—Co. Rd. Comr., Court House.

Pa., Braddock. **4 p.m., July 7.**
Grading and paving 400 ft. roadway.—W. H. Williams, Supt. Pub. Wks., Municipal Bldg.

Tenn., Nashville. **July 10.**
10.66 mi. state highway in Franklin Co., involving 16,812 cu. yd. excavation; 1,500 cu. yd. solid rock excavation; 101,750 sq. yd. waterbound macadam, 8 in. thick; 8,533 sq. yd. scarifying and reshaping; 520 lin. ft. 15 to 24-in. concrete or corrugated metal pipe, etc.; 12.27 mi. state highway in Bedford and Moore counties, involving 29,716 cu. yd. excavation; 5,935 cu. yd. solid rock excavation; 1.76 mi. grader work; 17,865 sq. yd. scarifying and reshaping; 12,000 sq. yd. 8½-in. waterbound macadam; 102,500 sq. yd. 8-in. gravel surfacing; 1,671 lin. ft. 15 and 25-in. concrete or corrugated metal pipe; two reinforced concrete bridges, etc.—W. P. Moore, Chief Engr., Dept. of Hwys.

Tex., Montague. **10 a.m., July 9**
9.84 mi. hwy. improvement in Montague Co., involving 45,482.9 cu. yd. borrow embankment, 105,301.4 cu. yd. gravel, concr. bridges and culverts, etc.

Tex., Baird. **noon, July 14.**
Grading, rock gravel, macadamizing and constructing culverts and bridges, involving 138,370 cu. yd. earth excav., 66,000 cu. yd. rock and gravel surfacing, 13 mi. road grader work, 1,300 cu. yd. rein. concr., and 40 tons reinforcing steel.—J. R. Black, Co. Judge.

Va., Roanoke. **noon, July 18.**
Granolithic sidewalks, curb and gutter, concrete paving and 8-in. sewer.—City Engr.

Wash., Olympia. **2 p.m., July 14.**
6.3 mi. gravel road in Thurston Co.; 7.1 mi. concrete roads in Grays Harbor Co.; 3.8 mi. concrete road in Walla Walla Co.; 7.8 mi. concrete roads in Yakima Co.; 14.3 mi. concrete roads in Clarke Co.; 6.7 mi. gravel road in Cowlitz Co.—J. Allen, State Hwy. Comr.

Wash., Seattle. **10 a.m., July 14.**
Grading and graveling 3½ mi. road and constructing 2,500-ft. piling trestle. —Bd. King Co. Comrs.

Wash., Vancouver. **July 12.**
Hard surfacing 4 mi. roadway.—M. E. Carson, Co. Comr.

BIDS ASKED FOR

Wash., Tukwila. **8 p.m., July 18.**
Grading roadway and constructing sidewalks in several streets—F. J. Klein, Supt. Streets.

Wis., Thorpe. **2 p.m., July 8.**
6,275 sq. yd. paving, 2,500 sq. yd. walls, and 620 lin. ft. curb.—O. C. Anderson, Co. Aud.

W. Va., Elkins. **1 p.m., July 8.**
19 mi. improved roads and streets in Randolph Co. with concrete macadam, tarvia, warrenite or asphaltic concrete pavement.—P. B. Bloomfield, Co. Clk.

W. Va., Fayetteville. **July 14.**
Grading 3 mi. Co. Hwy., involving 45,000 cu. yd. excav.—J. K. McGrath, Road Engr.

Wis., Racine. **10 a.m., July 12.**
Paving streets.—City Clk.

Man., Lorette. **2 p.m., July 7.**
Grading and ditching.—E. J. R. Arpin, Secy.-Treas., Municipality of Tache.

N. S., Halifax. **10 a.m., July 9.**
23,000 sq. yd. granite block pavement on concrete base; 133,000 sq. yd. bituminous pavement on concrete base and 30,000 sq. yd. bituminous pavement on macadam base and 33,000 lin. ft. concrete curb and gutter.—F. W. W. Doane, City Engr.

Ont., Kingston. **5 p.m., July 5.**
25,00 sq. yd. pavement on 4-in. concr. base, 10,500 lin. ft. combined curb and gutter.—R. J. McClelland, City Engr.

Ont., Toronto. **noon, July 5.**
Concr. sidewalks in various streets in York Twp.—F. Barber, Twp. Engr., 40 Jarvis St.

Ont., Caledonia. **noon, July 8.**
Grading, curbing, draining and laying road surface, involving 1,500 cu. yd. earth excav., 1,400 lin. ft. 6-in. concr. curb, 22,-700 sq. yd. tar penetration surface 3-in. thick on 6-in. stone base.—J. W. Avery, Vil. Clerk.

SEWERAGE.

Fla., Leesburg. **July 8.**
Sanitary sewers and sewage disposal works.—J. B. McCrary Co., Engrs., Third Natl. Bank Bldg., Atlanta, Ga.

Ind., Indianapolis. **10 a.m., July 15.**
Furnishing glazed sewer pipe for free gravel roads.—L. K. Fesler, Co. Aud.

Ind., Indianapolis. **10 a.m., July 11.**
Part of sewage disposal plant, involving 960 lin. ft. 84-in. reinforced concrete intercepting connecting conduit and 300 ft. 75-in. reinforced concrete sewer extension; reinforced concrete grit chambers and overflow; one small pumphouse; one 4-in. electric-driven drain pump, piping and valves; seven sluice gates; 1,000 lin. ft. 60-in. cast iron inverted siphon under river and 7,700 lin. ft. 78-in. reinforced concrete sanitary conduit. —C. H. Hurd, Cons. Engr., 1405 Merchants Bank Bldg.

Ind., Indianapolis. **July 11.**
Constructing grit chambers to connect with main interceptor, of reinforced concrete with 100,000,000-gal. capacity daily, and small pump house, in connection with sewage disposal plant.—C. S. Hurd, Cons. Engr.

Mich., Dearborn. **8 p.m., July 9.**
29,078 ft. 12 to 36-in. sewer and 85 manholes.—F. C. Reamer, Vil. Clk.

Minn., Milaca. **July 16.**
Sewer and water mains, involving 2,972 lin. ft. 15-18-in. sewer pipe and 1,572 lin. ft. 4-6-in. cast-iron water mains.—J. B. Gray, Engr.

Minn., North Mankato. **9 p.m., July 14.**
Sewer system, involving 3 pumping stations or lifts; 75 manholes, 2 14-in. valves, 24,000 ft. vitr. clay sewer pipe from 8-15-in., 24,200 ft. trench from 5 ft. to 16 ft. deep.—Vil. Engr.

Minn., Duluth. **11 a.m., July 5.**
Sanitary sewer.—J. A. Farrell, Comr. Pub. Wks.

Minn., St. Paul. **10.30 a.m., July 7.**
Sewers in various streets and storm water sewer.—H. W. Austin, City Purchasing Agt.

Minn., Melrose. **8 p.m., July 8.**
Furnishing sewer and water materials. —F. E. Weisser, City Clk.

Mo., Kansas City. **2 p.m., Aug. 14.**
Turkey Creek sewer, involving 5 mi. sewer.—A. D. Ludlow, Engr., City Hall.

Neb., Fullerton. **8 p.m., July 8.**
Sewers in 2 dists.—E. R. Tranbarger, City Clerk.

N. J., Linden. **8 p.m., July 7.**
1,100 ft. 8-in. stoneware pipe sewer with all appurtenances in 3 streets.—J. L. Bauer, Twp. Engr., 120 Broad St., Elizabeth.

N. J., Pleasantville. **8 p.m., July 7.**
Sanitary sewerage system, involving 9.3 mi. 8-in. to 15-in. terra cotta pipe sewers, 1,260 Y branches, 5-in. terra cotta house connections, 123 manholes, etc.—Remington & Vosbury, Engrs., 601 Market St., Camden, N. J.

N. J., Passaic. **10.30 a.m., July 7.**
Extending storm water sewer or drain, involving 400 lin. ft. 12 and 18-in. vitr. pipe, 2.69 tons 20-in. cast-iron pipe at outfall, 3 manholes, trenching, etc.—City Engr., Municipal Bldg.

N. M., Albuquerque. **2 p.m., July 12.**
(Change of date.)
105,000 sq. yd. pavement, 50,000 lin. ft. curb and gutter, 12,000 sq. yd. alley pavement, 12,400 ft. 8 to 36-in. clay vitrified sewer and necessary manholes and catch-basins.—City Engr.

N. Y., New York. **10.30 a.m., July 8.**
Storm water drain and combined sewers and appurtenances in various streets.—H. Bruckner, Pres., Boro. og Bronx.

N. Y., Niagara Falls. **10 a.m., July 8.**
Sewers in various city streets, involving 13,546 lin. ft. 8 to 60-in. sewer, 314 ft .tile sewer, 70 manholes, 109 catch basins, and connections, 303 Y's, excavating, relaying pavement, etc.—City Engr., Convention Hall.

N., D., Jamestown. **8 p.m., July 7.**
Storm water sewers.—C. E. McElroy, City Aud.

O., Columbus. **July 11.**
Sewage disposal and electric lighting and water system for school building of village of Brice.—Jones & Abernathy, Archts., Bd. Education, Truro. Twp.

O., Hicksville. **July 8.**
Sewering with cement pipe sewer tile, segment blk. or vitr. pipe sewer tile and building manholes, branches, catch basins, etc., on 6 vil. streets.—Vil. Engr.

O., Fremont. **July 9.**
625 ft. 12 to 18-in. storm sewer pipe and 2 inlets.—Wm. A. Baker, Serv. Dir.

S. D., Aberdeen. **9 a.m., July 28.**
Storm sewer, involving 8 mi. vitrified, segmental block or concrete pipe from 10 to 96 in. in diameter, with 100 manholes and 212 catch basins.—F. W. Raymond, City Aud.

Va., Roanoke. **noon, July 18.**
8-in. sewer.—W. P. Hunter, City Engr.

Wis., Durand. **8 p.m., July 10.**
System of sanitary sewers, involving 22,800 ft. 8-in. sewer, 5,960 ft. 10 to 22-in. sewer, 85 manholes and 14 lamp holes.—C. P. Layne, City Clk.

Wis., Janesville. **2 p.m., July 10.**
12,013 ft. 8-in. sewer pipe, 2,103 ft. 10-in., 2,006 ft. 12-in. pipe, 48 manholes, 15 lamp holes.—V. E. Hemming, Clk.

WATER SUPPLY.

Colo., Sedgwick. **noon, July 8.**
Municipal electric light and waterworks system, involving one 50,000-gal. steel tank on steel tower 100 ft. high; 4,500 ft. 4 to 8-in. Class B cast iron pipe; 11 fire hydrants, four gate valves; one 6x8 vertical single acting triplex pump; one 8-in. tubular well; one brick pump house; pole line material for local distributing system and transmission line, etc.—W. L. Muller, Clk.

Ia., Decorah. **7:30 p.m., July 16.**
11,400 lin. ft. 4-in. water main, necessary connections to valves, T's, L's and fire hydrants, relaying 600 ft. 10-in. vitr. sewer pipe.—M. D. Wells, City Clk.

Ia., Wapello. **1 p.m., July 15.**
Steam driven pumping plant containing one 36-in. and one 24-in. double suction centrifugal pump.—Elliott & Harmon Engrg. Co., Peoria, Ill.

Minn., Brainerd. **7.30 p.m., July 7.**
Pumping equipment for proposed improvements in waterworks system, consisting of two motor and engine driven, 3-stage centrifugal fire pumps, two motor and belt driven vertical centrifugal low service pumps, one vertical motor driven centrifugal low service pump and two motor driven sump pumps.—L. P. Wolff, Engr., St. Paul.

Minn., Harmony. **8.30 p.m, July 8**
Hydraulic pressure tank and housing. —Druar & Smith, Engrs., Globe Bldg., St. Paul.

Mont., Denton. **July 15.**
200,000-gal. reservoir, supply mains, distribution system and fire hydrants, involving 18,000 ft. 10-12-in. wood and 8,000 ft. 6-8-in. cast-iron pipe.—W. B. Saunders, Engr., Helena.

Mo., Kansas City. **2 p.m., July 9.**
Furnishing 30 and 36-in. cast iron specials.—W. G. Goodman, Chief Engr., Fire and Water Board.

N. J., Jersey City. **2 p.m., July 8.**
Furnishing cast iron water pipe; also 20 tons water gate boxes and covers and sewer manhole frames and covers.—F. A. Dolan, City Clk.

N. Y., Niagara Falls. **10 am., July 8.**
Water main, involving 730 lin. ft. 6-in. cast iron pipe, also lowering 300 lin. ft. 6-in. cast iron water main, and 200 lin. ft. 3 to 4-in. lead water connections, etc. —City Engr., Convention Hall.

O., Canton. **July 12.**
Water fittings for new reservoir in Union Dam field.—Pub. Serv. Dir.

R. I., Providence. **2.15 p.m., July 7.**
91 tons cast iron water pipe.—Comr. Pub. Wks.

Wis., Milwaukee. **10.30 a.m., July 16.**
One 20,000,000 gal. pumping engine.—Wm. R. Callahan, Purch. Agt., Central Bd. of Purchases.

Ont., Aurora. **5 p.m., July 11.**
Centrifugal pump of 750 gal. per minute capacity, driven by gasoline engine. —James, Loudon & Hertzberg, Ltd., 36 Toronto St., Toronto, Engrs.

Ont., Toronto. **noon, July 10.**
8,024 ft. 6-in. cast iron water mains on two roads in Twp of York.—F. Barber, Engr., 40 Jarvis St.

LIGHTING AND POWER.

N. J., Atlantic City. **11 a.m., July 9.**
Furnishing illumination of boulevard for period of 5 years.—A. H. Nelson, Co. Engr., 636 Guarantee Trust Bldg.

Greece. **Sept. 11.**
Installation and operation under contract for a period of years of an electrical plant to furnish light and power to city in Greece and its surroundings.—Bur. of Foreign and Domestic Commerce, Washington, D. C. (Refer to Opportunity No. 29759.)

Minn., Wells. **8 p.m., July 10.**
Completing power plant bldg., concr. reservoir and furnishing power plant equipment.—C. L. Pillsburg Co., Engrs., 813 Metropolitan Life Bldg.

N. D., Church's Ferry. **3.15 p.m., July 11.**
Electric lighting system.—H. A. Moe, Vil. Clerk.

FIRE EQUIPMENT.

O., Mansfield. **July 7.**
Two thousand ft. 2½-in. standard fire hose in 50-ft. sections, with couplings.—W. L. Cotter, Dir. Pub. Safety.

BRIDGES.

Fla., Jacksonville. **July 22.**
Bridge across St. Johns River.—County Comrs.

Ga., Rome. **noon, July 22.**
Concrete bridge across Cabin Creek in Floyd Co.—J. R. Cantrell, Chmn., Bd. of Comrs. of Roads and Revenues.

Ill., Decatur. **July 5.**
Bridge in Macon Co.—P. T. Hicks, Co. Supt. Hwys.

Ill., Springfield. **10 a.m., July 9.**
Six reinforced concrete bridges in Fulton Co.—G. F. Burch, Bridge Engr., Division of Hwys.

Ind., Shoals. **noon, July 17.**
Completing bridge by grading, draining and paving road in Holbert Twp.—Lorenzo D. Haga, Co. Aud.

Ind., Winamac. **noon, July 8.**
Three bridges.—J. C. Howe, Co. Aud.

Ind., Kokomo. **2 p.m., July 9.**
Reinforced concrete bridge in Center Twp., arch bridge in Ervin Twp., and bridges in Taylor, Honey Creek and Monroe Twps.—Wm. L. Benson, Co. Aud.

BIDS ASKED FOR

Ind., Monticello. 2 p.m., July 8.
Repairing abutment and wing, two abutments and erecting old bridge on two county roads.—F. E. Vinson, Co. Aud.

Ind., Logansport. 10 a.m., July 8.
Repairing and constructing bridges in Clinton, Jefferson, Harrison and Clay Twps.—H. M. Gardner, Co. Aud.

Ind., Columbus. 10 a.m., July 8.
Reinforced concrete bridge in Rockcreek Twp. and one in Sandcreek Twp. —R. Henderson, Co. Aud.

Ia., Cedar Rapids. 10 a.m., July 15.
6-span concrete steel arch highway bridge over Cedar River and removal of present structure.—Marsh Engrg. Co., Engrs., Des Moines.

Mich., Adrian. 4 p.m., July 10.
Reinforced concrete bridge over Raisin River.—G. P. Love, City Clk.

Minn., Aitkin. July 10.
Bridge with rein. concr. abutments.—H. C. Beecher, Co. Aud.

Minn., Faribault. July 16.
Widening roadway of bridge in Rice Co.—F. M. Kaisersatt, Co. Aud.

Minn., Walker. 10 a.m., July 22.
Bridge on State road in Cass Co.—C. D. Bacon, Co. Aud.

Minn., Princeton. 2 p.m., July 14.
Steel and concr. bridge across Rum River.—W. Peltier, Co. Aud.

Neb., Grand Island. July 15.
800-ft. bridge 16 ft. wide, 16 50-ft. rein. concr. arch spans and 3,000 lin. ft. approach fill.—G. E. Johnson, State Hwy. Dept., Lincoln.

N. J., North Plainfield. 2.30 p.m., July 10.
Reinforced concrete bridge over Green Brook, with two new concrete abutments and one pier, etc.—J. L. Bauer, Co. Engr., 120 Broad St., Elizabeth.

N. J., Camden. 11 a.m., July 7.
Reinforced concrete arch bridge over Newton Creek, involving 1,400 cu. yd. concrete, 292 piles, 6,000 cu. yd. earth fill and 712 sq. yd. amiesite road with concrete base.—J. J. Albertson, Co. Engr.

N. J., Rahway. 2.30 p.m., July 27.
Concrete and steel beam, 3-span bridge over Rahway River.—J. L. Bauer, Co. Engr., 120 Broad St., Elizabeth.

N. J., Atlantic City. 11 a.m., July 9.
Addition to present highway bridge over Patcong Creek, reconstructing bridge over Indian Cabin Creek, and extending Beach Thorofare Bridge on Pleasantville Blvd.—A. H. Nelson, Co. Engr., 636 Guarantee Trust Bldg.

N. Y., Elmira. 11 a.m., July 14.
Concr. bridge, 830 ft. long and 30 ft. high, with 8 arches, over the Chemung River.—City Engr., City Hall.

N. Y., Lake George. 12 p.m., July 10.
300 ft. clear span through truss steel bridge, with wood block pavement, new concrete abutments and wing-walls of 3d class concrete.—Co. Supt. Hwys., Warrensburgh, N. Y.

N. Y., Elmira. 11 a.m., July 7.
Concrete bridge 830 ft. long, with 8 arches over Chemung River.—City Engr., City Hall.

N. D., Jamestown. 2 p.m., July 12.
Twelve bridges in Stutsman Co.—A. Blewett, Co. Aud.

O., Canton. 9 a.m., July 14.
Culvert on Cleveland-Massillon Rd.—W. C. Shick, Clk., Bd. Co. Comrs.

O., Bellaire. July 21.
Nine reinforced concrete bridges.—B. W. Hopkins, Co. Aud.

O., Ravenna. July 14.
Cantilever concr. bridge over Cuyahoga River.—G. Bechtle, Aud.

O., Columbus. July 16.
Superstructure of bridge, including removal of old superstructure, paving, etc. —W. J. Herman, Clk. Bd. Comrs.

Ont., Toronto. noon, July 21.
Concrete bridge or steel bridge with concrete substructure.—W. A. McLean, Deputy Minister of Hwys.

O., Marion. July 11.
3 rein. concr. bridges, wool blk. floor for 3 bridges, guard rail and road over bridge, and substructure for bridge.—M. J. Morrall, Chn. Bd. Comrs.

O., Canton. 9 a.m., Jully 14.
Concr. arch over Nimishillen Creek, also culvert on Cleveland-Massillon road. —W. C. Schick, Clk., Bd. Co. Comrs.

O., Dayton. 10 a.m., July 10.
Bridge in Jackson Twp.—Co. Comrs.

Pa., Reading. 10 a.m., July 8.
Reinforced concrete girder bridge across West Branch Creek in Washington Twp.—C. J. Rhode, Co. Contr.

Dominican Republic, Santo Domingo. 10 a.m., Sept. 30.
Rein. Concr. bridge and approaches over the Rio Yaque del Sur in the Province of Azua, consisting of 2 rein. concr. arches 91 ft. span each, and 4 slab spans 22 ft. each, 304 ft. long and 18 ft. 9 in. wide.—Dir. Gen Pub. Wks.

MISCELLANEOUS.

Cal., San Francisco. 2 p.m., July 30.
Constructing Hetch Hetchy dam and appurtenant works in Tuolumne Co., involving 77,000 cu. yd. excav. below stream level; 60,500 cu. yd. excav. above stream level; 298,800 cu. yd. cyclopean masonry, and 66,850 cu. yd. concr.—M. M. O'Shaughnessy, City Engr.

Cal., Los Angeles. 11 a.m., July 18.
Silt diversion works near Los Angeles and Long Beach harbors.—U. S. Engr. Office, 725 Central Bld.

Fla., Ft. Pierce. 2 p.m., July 30.
Inlet cut and riprapping (inside work), and outside channel and jetties (outside work), involving 85,000 cu. yd. earth excav.; 1,720 cu. yd. jetty hearting, 2,200 tons jetty capping and 1,200 cu. yd. riprap.—M. Hallowes, Chief Engr., Ft. Pierce Inlet Dist.

Fla., Jacksonville. noon, July 24.
Jetty at entrance to St. Johns River.—U. S. Engrg. Office.

Ga., Savannah. noon, July 21.
Dredging in Savannah harbor.—U. S. Engrg. Office, P. O. Bldg.

Ia., Marshalltown. 2 p.m., July 15.
Straightening, widening, deepening and changing channel of the Iowa River, 1,400,000 yards.—F. B. Ingersoll, Engr. in Charge.

Md., Baltimore. 1 p.m., July 21.
Dredging in channel to Curtis Bay.—U. S. Engrg. Office.

Mich., Sault Ste. Marie. 4 p.m., July 22.
Dredging Grosse Pointe Channel, Lake St. Clair.—U. S. Engr. Office.

Mo., Sedalia. July 7.
20-ton incinerator.—F. T. Leaming, City Engr.

N. J., Somers Point. 8 p.m., July 7.
Reconstructing municipal pier.—J. E. Scull, City Clk.

N. Y., Albany. noon, July 15.
Barge canal terminal at Flushing, N. Y. City; furnishing industrial freight-handling trailers and stevedore freight-handling trucks for barge canal terminals.—E. S. Walsh, Supt. Pub. Wks., Albany, N. Y.

N. Y., New York. noon, July 21.
Dredging in Passaic River, N. J.—U. S. Engr. Office, 39 Whitehall St.

Pa., Philadelphia. noon, July 25.
Dredging in Schuylkill River.—U. S. Engrg. Office.

Hawaii, Honolulu. 11 a.m., Aug. 26.
Dredging in Honolulu harbor.—U. S. Engrg. Office, 401 Custom House, San Francisco.

STREETS AND ROADS

D. C., Washington—Major Herbert L. Buell, of engineer corps, asked ways and means committee to increase house appropriation of $100,000 for post roads in Alaska to $300,000. He estimated $279,000 would be required for maintenance of these roads, while remainder would be used for construction of additional roads in Southeastern Alaska.

Ida., Nampa—Nampa Hwy. Dist. last week voted in favor of $500,000 bond issue. Preparations for road improvement program will be immediately begun. Bonds will be sold. Considerable preliminary work must be done before actual work of road improvement can be started, but this will be rushed to an early completion.

Idaho, Rupert—An election will be held July 15 for issuance of municipal bonds for paving 12 downtown blocks. Estimated cost, $118,375.

Ida., Twin Falls—Twin Falls voted two-year municipal improvement program, involving assurance of $205,000 municipal bonds and an aggregate expenditure of about $75,000. Three propositions submitted as follows: $115,000 for paving, $50,000 for bridge across Rock Creek on Shoshone St., $40,000 for extension of trunk line sewer.

Ill., Danville—The following public work is being started, with requests for more coming in rapidly: 17,000 sq. yds. of asphalt macadam pavement on Harmon Ave. under construction. Bids will be asked for paving of Cronkite and Kentucky Aves., total of 4,000 ft. asphalt brick 27 ft. wide. Also following streets: Perrysville Rd., 1 mile; Chanler St., 2,600 ft.; Fairchild St., 3,500 ft.; West Winter Ave., 2,300 ft.; Sherman St., 2,700 ft., and Mann St., 550 ft., all to have brick pavements, with asphalt filler 27 ft. wide, and 4-in. concrete base. Also Logan Ave., 30 ft. wide, to be resurfaced one-half mile with tarvia macadam.

Ill., Decatur—Members of City Council signed ordinances for paving Prairie and Taylor Ave., from West Main to I. T. S. right of way. Cost of Prairie St. improvement estimated at $72,486.19. The Taylor Ave. project, which will have brick for wearing surface, will cost $9,-201.86.

Ind., Indianapolis—Four contractors in other cities will submit bids on next street improvement work. The Board instructed Mr. Lingenfelter to push work on the improvement of downtown streets first. Resolution for resurfacing North St. was confirmed. The Board adopted preliminary resolutions for following improvements: Resurfacing of South St., resurfacing of New York St., resurfacing Ft. Wayne Ave., resurfacing South St., resurfacing Madison Ave., sidewalks on north side of 44th St.; sidewalks in Buckingham Dr. and in Blue Ridge Rd., and for grading the first alley east of Irvington Ave., from Lowell Ave. to Whittier Pl.

Ind., Princeton—State Bd. of Tax Comrs. received petition for bond issue of $356,000 in Gibson Co. Money is desired for improvement of roads.

Ia., Davenport—City Council intends to spend $19,388 for improvement of five streets.

Ia., Dubuque—Resolutions for the improvement of Military Highway from here to Cascade have been adopted by County Board of Supervisors. The resolutions will be sent to State Highway Commission and if approved work on the road will be started without delay. Approximately $174,000 will be spent on this work.

Ia., Strawberry Point—Intends to construct 2¼ mi. of paving 4½ mi. combined curb and gutter. Resolutions passed. Plans in progress. Wm. F. Reinecke, Mayor; H. R. Green, Cedar Rapids, Engr.

Kan., Wichita—Four paving petitions have been granted by the City Comrs., as follows: Hiram Ave., sheet asphalt; Fern St., asphalt; Lulu Ave., concrete.

La., Opelousas—Residents of 11th Rd. Dist. of St. Landry Parish voted in favor of $500,000 good roads bond issue. Model highways are to be constructed in district under supervision of State and Federal authorities.

Mich., Howell—Three north and south roads through county now under consideration by Co. Bd. of Comrs. Petition calls for road from Fleming north to county line; another goes from Thomas Brown's, in Cohoctah, north to the county line.

Mich., Northville—Northville voted overwhelmingly to bond for $32,000 to pave two and a quarter miles of Seven Mile Rd. from present end of the Seven Mile paving at the village limits to the Detroit City Hospital, west of town. Work on the paving will be begun at once. It will be from curb to curb in the village and 20 ft. wide elsewhere.

Minn., Moorhead—Bond issue of $125,-000 for construction of paved highway from this city to Glyndon, Minn., will be voted on by Clay Co. citizens on Aug. 5, according to agreement by Co. Comrs.

Miss., Jackson—Official announcement is made of an election on issuing $200,-

000 bonds for streets, sewers and schools.

Miss., Yazoo City—The county of Warren, adjoining Yazoo, proposes to put $800,000 into roads principally in its eastern section.

Mo., Kansas City—Seven paving proceedings will be up for hearing before the Bd. of Pub. Wks.: Troost Ave. from 28th to 31st Sts.; Harrison St. from 15th to 18th Sts.; 15th St., 20th St., 13th St., 14th St., Highland Ave. from 23d to 25th Sts. The board will hear property owners on proposal to pave Westport Ave. July 1 and Beardsley Road and Kersey Coates Drive to Bluff St., July 8.

Mo., Kansas City—The paving of 50th St., from the city limits at Topping Ave. to Swope Pkway, was discussed at meeting of Blue Valley Improvement Association. The road to be paved is about a mile and a quarter long. It is proposed to lay strip of macadam a foot thick and 18 ft. wide from Topping Ave. west to end of Blue Valley car line, and from there 9 ft. on each side of the tracks.

Mo., St. Louis—City Council discusses resolution to approve construction of national thoroughfare, the Arcadian Way, and proposes to appropriate $25,000 for cost of making survey, etc., within city limits.

N. J., Garfield City—City Council received petition for improving of Midland Ave. Various resolutions were passed for altering of many streets.

N. Y., New Rochelle—Here are some of the road projects brought before Council: Repairs to Washington Ave.; sum of $640 is required by St. Dept. To lay penetration macadam in Winyah Ave. would cost $14,560, and estimate board was asked to supply this money to the St. Dept. The St. Depts. wants $19,000 for resurfacing Quaker Ridge Rd. For repaving Main St. would cost city $67,000, the Pub. Wks. Dept. estimates. The matter of resurfacing Webster Ave. was referred to Council Committee of the Whole. The Pub. Wks. Dept. estimates cost at $34,000. The Pub. Wks. Dept. estimates that city's share of repaving North Ave. would be approximately $47,-250. For repairing Esplanade, Beechmont, and placing gutters there, an estimate of cost was asked by Council. It was voted to ask Pub. Wks. Comr. to provide Council an estimate of cost for penetration macadam in Morgan St., the entrance to city dump.

N. Y., Niagara Falls—Among many improvements suggested and referred to City Manager for action were water main in Cliff St., at estimated cost $1,650; paving in 15th St., estimated cost, $5,000; paving in Mackenna Ave., from 22d to 24th St., estimated cost $17,000, and paving alley between 13th and 15th St., estimated cost $3,000.

N. Y., Yonkers—City Council discusses many streets improvements.

N. Y., Oswego—This part of the State —especially Oswego Co.—will see considerable work done in public improvements, such as highways and paving, this year. Oswego will expend $100,000; Phoenix, $27,000; Mexico will do considerable, while Fulton will expend $121,000 in this line of work, including sewers and water mains.

N. C., Lumberton—Amount of bonds voted by each of eight townships was: Maxton, $100,000; Red Springs, $10,000; Smith, $75,000; Pembroke, $50,000; Orrum, $25,000; Gaddy, $20,000; Howellsville, $75,000; Shannon, $10,000. Five Robeson townships already voted bonds for building roads as follows: Rowland, $50,000; Parkton, $20,000; Fairmont, $60,000; St. Pauls, $25,000; Lumberton, $100,000. Four other townships will vote on issuing bonds for road purposes July 15. These are: Lumber Bridge, $20,000; Wishart, $50,000; Thompson, $60,-000; Alfordsville, $60,000.

O., Canton—Sealed proposals will be received at Board of Stark Co. Comrs. July 7, 1919, for purchase of bonds of Stark Co., as follows: Alliance-Minerva Rd., $65,000; Louisville-Freeburg Rd., $62,000; Massillon-Orrville Rd., $48,000; Beach City-Strasburg Rd., $20,000; Canton-Middlebranch Rd., $32,000; Navarre Village, $6,000.

O., Cincinnati—City will receive sealed bids until July 8 for $15,000 bond issue for improvement of Carthage-Hamilton Rd.

O., Cleveland—City Council considering appropriation of $70,000 and $15,000 for improvement of Carnegie Ave. and East Blvd., respectively.

O., Dayton—Commissioners of Montgomery Co. have asked bids on bond issue of $15,500 for improvement of an inter-county road.

O., Delaware—On July 10 Delaware Co. will receive bids on bond issues of $11,400, $9,200, $20,000, same to be used for improvement of Blackledge Rd., Comstock Rd. and the Lott Rd., respectively.

O., Findlay—Audr. of Hancock Co. will receive sealed bids until July 7 for $150,-000 road bonds.

Okla., Tulsa—Preparatory to awarding contracts for street paving, City Engineers have been making compilations of costs. Boston Ave., which will have the parkings eliminated and widened 20 ft., from 4th to 5th Sts., will cost $5,-475.53; Boulder Ave., which is also to be widened 20 ft. by cutting away parkings, from 3d to 6th St., will cost $18,-534.21; Main St., Cheyenne Ave., and Marshall St., a distance of about five blocks, will be paved 26 ft. in width and cost $56,985.23.

Ore., Albany—Portions of four Albany streets will be paved this summer if satisfactory bids are received. The work is to be done on 6th, Elm and 1st Sts. and on Salem road.

Ore., Portland—Word was received here from Washington that bill appropriating $2,500,000 to match similar amount voted by people of Oregon for completion of Roosevelt military highway along Oregon Coast was introduced. Representative Lea, of California, was to introduce bill in the House, it was stated, asking $1,500,000 to extend this highway to San Francisco.

Pa., Germantown—City Council is considering the improvement of many streets by grading, paving, etc.

R. I., Lincoln—Town has requested State Legislature for appropriation of $40,000 for rebuilding road on Smithfield Ave.

Tex., Austin—Comn. granted to Bexar Co. Federal aid of $81,078 on the East or SAP Branch of Highway No. 9, between San Antonio and Wilson Co. line. Hartley Co. was awarded $25,405 State aid on Hwy. No. 5, and that highway was further designated from Clarksville to Bagwell, Blossom, Detroit and Paris. Hwy. No. 39 was more definitely designated in Delta Co., from Cooper to Commerce, via Klondike and Horton. Hwy. No. 36 was extended from Freeport to Quintana. Stonewall Co. was granted State aid of $3,300 for construction of bridge across Brazos River on Hwy. No. 18. Baylor Co. was given $5,491 State aid.

Tex., Belton—Town voted in favor of two bond issues: $75,000 for street improvement and $25,000 for park improvement.

Tex., Breckenridge—Preliminary arrangements are being made by Breckenridge citizens to call election for purpose of voting road bonds. First estimates of road construction place probable cost at $2,500,000.

Tex., Dallas—City Comrs. approved sale of $2,300,000 bonds voted by the citizens of Dallas. Of the total issue. $750,000 is for the school improvement fund, $1,200,000 for the street improvement fund, and $300,000 for the Park Board improvements. It is purposed to sell these bonds as soon as they are issued and satisfactory bids are received.

Tex., De Leon—Acting upon petition, Comrs. Court of Comanche Co. has ordered election to be held July 15 in Special Road Dist. No. 2 for purpose of issuing $750,000 road bonds for permanent roads. It is purpose of the people of the district to create system of permanent roads in northern portion of the county.

Tex., Denton—Atty.-Gen. approved $1,-500,000 good road bonds for Denton Co. Rd. Dist. No. 3.

Tex., Ft. Worth—Dr. J. W. Head proposes to spend $100,000 in paving and landscaping property joining the Forset Park Pl. if City Comn. will build sewer line from 7th St. to northeast corner of the tract. It is estimated that city's share of improvements, including sewer extension and construction of paving intersections will cost around $26,000.

Tex., Fort Worth—Tarrant Co. Comrs. ordered road bond election of $3,450,000 on July 26. $450,000 will be used to construct bridges and culverts; $3,000,000 for hard-surfaced roads.

Tex., Laredo—Webb Co. in favor of road bonds of $300,000.

Tex., Marble Falls—An election for $55,000 road bond issue for lower part of Burnet Co. joining Travis, Blanco and Llano Cos. ordered for July 12.

Tex., San Antonio—City ordinance authorizing the calling of election in San Antonio on proposed issue of $3,750,000 bonds for public improvements was held to be valid.

Tex., Stamford—See "Water Supply."

Tex., Weatherford—City has asked bids until June 24 on $60,000 bond issue for street improvements.

Va., Richmond—Governor Davis, of Virginia has named road construction board of prominent citizens to advise in adoption of good roads program for Virginia. A highway bond issue of $40,-000,000 is recommended by the executive.

Va., Roanoke—City Mgr. Hunter asked authority to advertise for bids for curb and gutter on several streets; material used on Tazewell St. to be concrete.

Wash., Hoquiam—Several property owners on Monroe and Perry Sts. and Railroad Ave., which are to become part of the Olympic Highway, having filed a protest because of alleged width of proposed paving. The improvement as planned contemplates roadways of concrete 20 ft. wide on each side of street car track, and 8-ft. walks. Engineer's estimate shows that estimated cost is $61,500.

Wash., Kelso—Plans to pave more than 40 blocks and to lay concrete sidewalks on these streets were formulated at a meeting of city council, which passed resolution creating local improvement district for this purpose. The plan contemplates a 16-foot pavement.

Wash., Olympia—Plans of Washington State Hwy. Comn. for improvement of the Pacific Hwy. in Thurston Co., 6.83 miles in length, will involve laying of 80,817 sq. yds. of concrete paving and 17,000 cu. yds. of excavation, and cost $175,000.

Wash., Ridgefield—The town is advertising for sealed proposals for hard surfacing Pioneer Ave., Main St. and Lake St. This paving will connect with a new paved road from Pioneer to Ridgefield and citizens here will have paving all the way to Vancouver.

Wash., Spokane—Four miles of the Apple Way will be built at once with federal aid money. Government aid money consists of $54,209. Department of Agriculture approved other road building projects in Eastern Washington as follows: Central Washington Highway in Spokane Co., 7 8-10 miles, federal aid, $40,525; Sunset Highway, 4 89-100 miles, federal aid, $21,321; Sunset Highway, 4½ miles, federal aid, $59,298.

Wash., Tacoma—Citizens voted favorably on road plan calling for $2,500,000 to be spent immediately on main roads of county. Approximately 100 miles of road will be constructed, including the

MUNICIPAL AND CORPORATION BONDS PURCHASED

Correspondence invited from officers of Municipalities and from well-established industrial corporations contemplating new financing.

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Mount Ranier road. The Port Comn. will purchase 40 acres of undeveloped land and put in large system of docks and loading facilities.

Wash., Vancouver—Plans have been filed covering construction of Hazeldell-Felida Rd., from Pacific Hwy. to Felida, in Clarke Co. The work contemplated involves 42,812 sq. yds. of paving, 7,325 cu. yds. of excavation, 8,206 cu. yds. of embankment. Estimate of Co. Engr. B. L. Dorman puts cost of work at $114,-946.55.

W. Va., Charleston—City council decides to improve Virginia street by raising, widening.

W. Va., Charleston—City Engr. Bruce is now engaged with plans for improvements of great many streets in city by laying concrete sidewalks and doing necessary grading.

W. Va., Charleston—State Rd. Comn. has announced approval of plans for road construction in Putnam, Raleigh and Monongalia counties. The Putnam county with Cabell Co., is estimated to cost $140,000. Raleigh Co. plans for five mi. of road on the Giles, Fayette and Kanawha Turnpike, to be constructed of Rd., four mi. in length, to connect that macadam and cost $54,000. The Monongalia Co. plans for 4½ mi. on the Randall-Mt. Morris Rd. show cost of $88,000. The road will be of concrete.

B. C., Victoria—Plans prepared by City Engineer F. M. Preston for construction of Johnson St. bridge approved by City Council. Estimated cost, $520,-000.

Ont., Pembroke—An asphaltic concrete roadway will be constructed on Pembroke St. Estimated cost, $37,354.35. W. J. Moore, Acting Town Clk.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Cal., Marysville (Yuba Co.)**—City Council awarded contract to Municipal Improvement Co. to pave 12th St., from B St. to the Browns Valley grade. Cost slightly in excess of $13,000.

***Ill., Chicago**—Contract for construction of eighteen miles of concrete on what is known as Archer Ave. road between Summit and Joliet was let last week to a Chicago firm, according to announcement of division of highways of department of public works at Springfield. Contract price $364,000.

Ill., Springfield—Bids received June 25 by division of highways: Jas. Black Masonry & Construction Co., Springfield, Ill., St. Louis Federal-air Rd., Sangamon, G, $183,760.06; Sec. H, $218,293.60; Sec. C, $195,702.53; Sec. P-15d, $173,018.86; Macoupin, Sec. D, $216,209.30; L-15d, $80,-699.07; E, $214,758.15; F, $183,839.72; Comb. L-15d, E, F, D, $637,794.16. W. F. Smith & Co., Rensselaer, Ind., Macoupin, L-15d, $67,053; E, $200,729.29; F, $159,-040.03; Comb. L-15d, E, F, $391,622.32. Cameron, Joyce, Smith, Elder & Co., Keokuk, Ia., Sangamon, C, $190,836.76. Cameron, Joyce, Smith, Elder & Co., Keokuk, Ia., Marshall, A, $129,542.32; A2, $71,-079.34; Comb. A, A2, Warner Construction Co., 189 W. Madison St., Chicago, Ill., Marshall, A, $147,183.20; A2, $95,-980.04; Comb. A, A2, $222,851.95. Wilson Jaicks, River Forest, Ill., Marshall, A, $115,333.80; A2, $57,767.18. Henry K. Horst, Marshall, A, $123,822.41; A2, $63,-888.11; Comb. A, A2, $185,351.95. Holn-Page Co., Rockford, Ill., Marshall, A1, $117,061.60; A2, $69,012.62; Comb. A1, A2, $163,151.95. Keokuk Quarry & Construction Co., Keokuk, Ia., Marshall, A2, $70,-354.10. Douglas A. Myers, 209 N. Armstrong Ave., Peoria, Ill., Marshall, A, $112,754.14.

***Ind., Danville**—Comrs. of Hendricks County announce letting of contract for construction of gravel and macadamized road on line Monroe Twp., Morgan Co., and Liberty Twp., Hendricks Co., at $26,000, to O. J. Larkin, Coatsville, Ind.

***Ia., Aurelia**—Councilman Joe M. Lewis has been awarded contract for construction of $30,000 sewerage system. Between 40,000 and 50,000 ft. of sewer will be constructed.

***Ia., Marshalltown**—Contract for reconstruction of paving in South Second and Third Ave. was let by City Council to A. Carlson, of this city, the lowest bidder. The bid accepted is for reconstruction of pavement with course of vitrified paving brick, with asphalt filler, on present base, with such repair to the base as may be found necessary. Carlson's bid was $2.95 sq. yd. City Engineer Herm estimates total cost of construction at $40,000.

***Mo., St. Louis**—The Bd. of Pub. Service awarded following contracts to the Granite Bituminous Co.: For improving Arlington Ave., $51,229.45; for improving Emerson Ave., $40,093.15; for improving Sherman Pl., $11,080.90; for improving Terry Ave., $18,266.35; for improving north and South Reber Pl., and Reber Pl. formerly known as Old Manchester road, $33,460.50; for improving Portis Ave., $6,815.10.

***N Mex., Santa Fe**—Road contracts just let by New Mexico state highway commission reach total of $275,000. One for 16.7 miles running east from city of Roswell, to cost $145,000. This contract was given to Olsen and Burnham, of Laverne, Oklahoma, and includes grading, surfacing and bridges. The other contract is for $130,000 for 9.7 miles of scenic highway between Raton and Colorado line. Odell Brothers, of Colmor, New Mexico, secured this contract. Road is to be of crushed rock, crushed, surface with gravel. In addition to these two projects, state forces are beginning work on 6½ miles of road through the Mescalero sands, on road between Roswell and Texas line. The work through the sands will cost $75,000. The federal government participates in all three of these projects.

***N. Mex., Santa Fe**—Contract awarded Odell Bros., of Colmor, N. M., covering the grading, surfacing, culvert and bridge work on Federal Aid Road Project 1-A, covering distance of 9.7 mi. from Raton to the Colorado line in Confax Co., N. Mex., involving total expenditure of $130,000.

***N. Mex., Santa Fe**—Contract has been awarded to the Moor Construction Co., of El Paso, Tex., for the construction of approximately 12 mi. of concrete pavement, including bridges and culverts, at a cost of approximately $300,000. This is known as Federal Aid Project No. 15 and extends from Las Cruces to Mesquite, in Dona Ana Co.

***N. J., Passaic**—At meeting of Bergen Co. Board of Freeholders, contract for reconstruction of Paterson Plank road, from the Hackensack River to the Carlstadt Depot, was awarded John E. Dordon. of New York, for bid $179,476.30. This will mean granite block road with solid concrete base.

***O., Dayton**—State highway department awarded contract for paving Xenia pike out of Dayton for total of $67,000. It was reported that Contractors Williams and Little, of Cleveland, which firm is now engaged in other Montgomery Co. roadway work, was awarded contract. Several local contractors submitted bids on the paving.

***O., Fremont**—The Modern Construction Co. has contract for 6 miles of brick pavement east on Maumee pike at bid $333,000.

***Pa., Greensburg**—Tabulation of bids made by Co. Rd. Engr. for construction of 3.10 mi. of Greensburg-Scottdale Rd., Sec. 3, in East Huntington Twp., and for completion of Oak Grove-Wilpen Rd., 2.88 mi., in Ligonier Twp., completed. Corrado and Galiardi awarded contract and John Hermann the other. Bids follow: *Greensburg-Scottdale, Sec. 3, Corrado and Galiardi, brick, $140,436.18; concrete, $125,931.40; R. H. Cunningham & Sons, brick, $177,110.90; concrete, $147,-026.69; J. I. Dick, brick, $179,042.35; concrete, $148,514.96. *Oak Grove-Wilpen, John Hermann, brick, $96,010.20; concrete, $75,734.25; Dawson Construction Co., brick, $98,080.65; concrete, $94,025.70; Harrison & Co., brick, $117,609.70; concrete, $94,258.50.

Pa., Harrisburg—The following bids received by state highway commission: Blair Co., Hollidaysburg Borough. Route No. 260, 1,269 ft. reinforced concrete. George I. Thompson & Co., Clearfield, Pa., $20,843.75; Standard Contracting Co., Altoona, Pa., $19,879.85.

Columbia Co., Millville Borough, Routes Nos. 239 and 249, 9,122 ft. bit. surface course on a concrete foundation. Boyle Construction Co., Wilkes-Barre, Pa. (E), $84,629.76; Warren Brothers Co., Boston, Mass. (E), $98,332.54.

Columbia Co., Bloomsburg Borough, Routes Nos. 3 and 4, 10,870 ft. bituminous surface course on a concrete foundation and hillside vitrified brick. Warren Bros. Co., Boston, Mass. (D), $188,639.40; Wm. P. McDonald Const. Co., Philadelphia, Pa. (B), $156,345.24.

Dauphin Co., Upper Paxton Twp., Route No. 199, 24,765 ft. reinforced concrete. Hugh Nawn Contracting Co., Philadelphia, Pa., $186,862.80; Winston & Co., Kingston, N. Y., $211,584.20.

Dauphin Co., Lower Paxton Twp., Route No. 140, 12,725 ft. bituminous surface course on a concrete foundation or reinforced concrete. Hugh Nawn Contracting Co., Philadelphia, Pa., $143,-812.35; Warren Bros. Co., Boston, Mass., $176,048.90.

Lancaster Co., Providence and Strasburg Twps., Route No. 136, 21,506 ft. bituminous surface course on a concrete foundation or reinforced concrete. Claiborne-Johnston & Co., Inc., Baltimore, Md., $162,092.94; H. E. Culbertson Co., Cleveland, O., $206,763.47.

McKean Co., Wetmore and Hamlin Twps. and Mt. Jewett Borough, Route No. 95, 31,548 ft. reinforced concrete or vitrified brick. Claiborne-Johnston & CCo., Inc., Baltimore, Md., $202,002.18; Elmer M. Love & Son, Corry, Pa., $263,-154.10.

Northumberland Co., Shamokin Twp., Route No. 161, 25,693 ft. reinforced concrete and hillside vitrified brick. E. A. Corson, Ocean City, N. J., $207,680.38.

Northumberland Co., Sunbury Borough, Routes Nos. 18 and 25, 9,641 ft. bituminous surface course on a concrete foundation or reinforced concrete. Wertley & Houser, Pottsville, Pa., $64,006.90; Fiss & Christiano, Shamokin Dam, Pa., Snyder Co., $80,230.70.

Pa., Philadelphia—The following low bids were received by Bureau of Hwys. Prices in parenthesis indicate average price per sq. yd. Total amount of all low bids, $220,110.28: Schedule "A," Grading; total amount of low bids, $22,362.57, including cost of contingent work; 16,-703 cu. yds. excavation; average price, 46 cents per cu. yd: M. J. McCrudden, 805 Franklin Trust Bldg.; T. L. Flanagan, 1204 E. Montgomery Ave.; E. A. Mullen, 5512 Vine St.; Frank Mark Contracting Co., 2820 N. 21st St.

Schedule "B," improvement of Adams Barber Asphalt Paving Co., 239 N. 30th Ave.; total amount of low bid, $30,812.08;

Schedule "C," asphalt paving (assessment work); total amount of low bids, $38,632.90; asphalt paving (including 6-in. concrete base); ($2.76); vitrified block gutter paving (including 6-in. concrete base); ($4.07); Barber Asphalt Paving Co., 239 N. 30th St.

Schedule "D," asphalt repaving; total amount of low bids, $33,084.69; asphalt binder and surface (including 6-in. concrete base), ($2.35); dressed granite block (including sand cement cushion and 6-in. concrete base), ($5.62); redressed granite block (including sand cement cushion and 6-in. concrete base), ($3.02); vitrified block gutter paving (including sand cement cushion and 6-in. concrete base), ($3.71); disposing of existing asphalt, cobble and granite block paving (including subgrading), (54 cents); Barber Asphalt Paving Co., 239 N. 30th St.; Eastern Paving Co., 401 Colonial Trust Bldg.

Schedule "E," wood block repaving; total amount of low bids, $21,478.04; wood block (including sand cement cushion and 6-inch concrete base), ($5.50); J. Meehan & Son, 915 W. Dauphin St.; J. J. McHugh, 1430 S. Penn Sq.

Schedule "F," sprinkling macadam and dirt roads; average price per day per sprinkler, $6.65; E. A. Mullen, 5512 Vine St.; Est. of Richard B. Bennis, Chew and Price Sts.; Est. of David McMahon, Germantown.

Schedule "G," construction of bridges.

Schedule "H," repairing and painting bridges; total amount of low bids, $53,-760; Belmont Iron Works, 22d and Washington Ave.; George B. Clopp, 3717 Filbert St.; M. and J. B. McHugh, 892 N. Markoe St.; W. A. Mundy, 228 S. Alder St.

Schedule "I," furnishing and applying dust layer; total amount of low bid, $18,460; Headley Good Roads Co., Franklin Trust Bldg.

Erie Co., Mill Creek and Fairview Twps., Route 84, 27,049 ft. of construction: The Campbell Bros. Co., Youngstown, O., $237,684.43.

Erie Co., Wayne Twp., State-aid Application 629, 20,200 ft. of reinforced concrete: Highway Construction Co., Erie, Pa., $156,552.35.

Lancaster Co., East and West Hempfield Twps., Route 139, 37,684 ft. of construction: Freeland Construction Co., Freeland, Pa., $267,272.96.

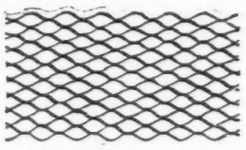
Lycoming Co., Platt and Woodward Twps., Route 25, Section 1, 39,319 ft. of reinforced concrete construction: W. J. Gephart, Pittsburgh, Pa., $525,830.71.

Mercer Co., Grove City Boro., Route 75, 3,678 ft. of construction: Brackenridge Sand & Gravel Co., Brackenridge, Pa., $44,168.85.

Potter Co., Eulalia and Roulette Twps., Route 101, Section 1, 26,400 ft. of construction: Barn & Devling, Galeton, Pa., $215,048.17.

TRUSCON EXPANDED METAL

The Complete Line



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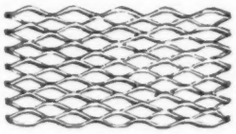
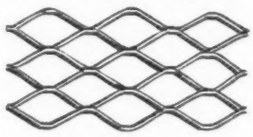
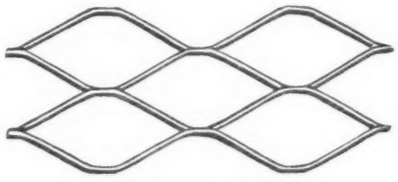


½" × 1 3/16" MESH

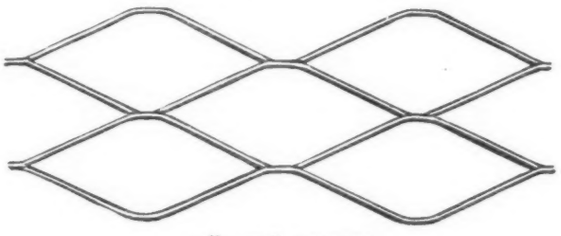


1" × 2⅛" MESH

1½" × 3" MESH



2¼" × 5" MESH



3" × 7" MESH

All sizes and types of expanded metal, from Diamond Lath to Truscon Road Mesh with the 6″ x 12″ diamond and eight sizes of Truscon Rib Metal, are included in Truscon Expanded Metal. Each size of diamond mesh is furnished in various weights.

Truscon Expanded Metal is the economical reinforcement for roads, bridges, culverts, sewers, floor slabs, roofs, porches, docks, retaining walls, tunnels, concrete ships and barges, concrete railway cars, etc. Its special uses include safety guards, elevator and stockroom enclosures, lockers, coke car sidings, etc.

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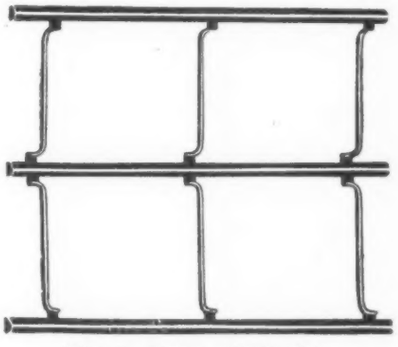
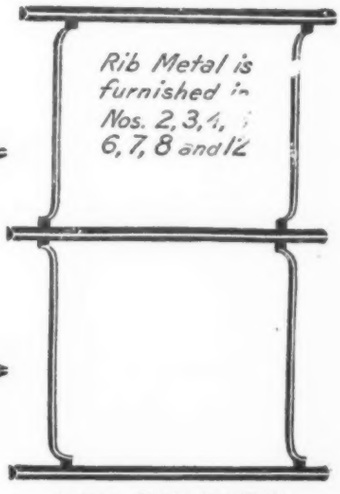
TRUSCON
BUILDING PRODUCTS



№4 RIB METAL

TRUSCON ROAD MESH (6" × 12")



№6 RIB METAL

Warren Co., Youngsville Boro., Route 30, Section 3, 6,544 ft. of reinforced concrete: Joseph McCormick & Bro., Erie, Pa., $39,905.50.

York Co. Carroll and Franklin Twps., Route 125, Sections 1 and 2, 40,172 ft. of construction: Langthorne & Co., New York City, $297,908.

***Utah, Salt Lake City**—Contracts were awarded Olaf Nelson for construction of stretch of highway from Logan to Wellsville, 8.13 miles, at cost $190,903.91: To P. J. Moran Co. for road between Logan and Smithfield, at cost $141,223.23; to J. W. Mellen for highway between Spanish Fork and Provo, at cost of $120,915.31.

Utah, Salt Lake City—Following bids received by State Highway Commission: Logan to Smithfield road, Gibbons & Reed, $145,189 or $24,475 a mile; Olaf Nelson, $148,128.57 or $23,512 a mile; P. J. Moran Co., $141,224.83 or $22,417 a mile, the lowest bid; Owen H. Gray, $162,634.25 or $25,815 a mile. For stretch of road between Logan and Wellsville, distance of 8.13 miles, there were five bidders. Included in bids on this roadway is state's cost for concrete, $67,795.12. The bids follow: Olaf Nelson, $190,903.91 or $23,841 a mile, the lowest bid; Gibbons & Reed, $200,692.91 or $24,685 a mile; P. J. Moran Co., $195,939.49 or $24,101 a mile; H. C. Gilkerson, $250,882.06. On road from Provo to Spanish Fork there were six bidders, the state's cost of $41,885.72 being included in each bid for concrete. Distance to be covered 4.81 miles. The bidders were: Heuser-Packard Co., $136,477.15 or $28,374 a mile; Gibbons & Reed, $137,210.64 or $28,526 a mile; Owen H. Gray, $128,740.75 or $26,765 a mile; H. C. Gilkerson, $124,870.49 or $25,857 a mile; F. N. Bingham, $136,930.09 or $28,468 a mile; J. W. Mellen, $120,915.31 or $25,138 a mile, the lowest bid. For a bitulithic top Heuser-Packard Co. bid $39,098 a mile and J. W. Mellen, $31,190 a mile.

***Wash., Cheney**—Cheney voted $90,000 paving contract to C. M. Payne of Spokane. Contract calls for paving of 38 blocks of city streets.

***Wash., Seattle**—East 50th St. et al., by paving, L. I. D. 3190. Contract let to low bidder on basis of 7-in. concrete on 7th Ave., and East 50th St. with 6-in. concrete on balance of work. F. McLellan low bidder at $101,079.10.

***Wash., Seattle**—Rainier Ave (57th Ave. S. to Ryan St.), L. I. D. 3197. Contract let to Frank McHugh on bid of $139,480.25.

SEWERAGE AND SANITATION

Ala., Anniston—City Council passes ordinance to construct sewer system through several streets and alleys.

Cal., Benicia—At meeting of the City Trustees, Attorney W. U. Goodman of Fairfield and City Engineer A. L. Steiger were present with plans and specifications for West Side sewer, which were adopted. Attorneys were instructed to procure the right of way for the Eide Side sewers.

Cal., Redwood City—City voted $25,000 for 340 lin. ft. 18-in. vitr. pipe outfall sewer; $60,000 for 8 reinforced concrete bridges. C. E. Dimmick, City Engr.

Ga., Jesup—An election is to be held in July for purpose of voting on $30,000,000 worth bonds for putting in sewerage in city.

Ill., Danville—City plans to construct sanitary sewer system, using Imhoff tank disposal. Estimate, $52,000. Also a number of short runs for both sanitary and storm sewers.

Ia., Hartley—Expects to construct one mile of storm water sewer, 12 to 36 in. Resolution introduced. H. T. Broders, Clerk; H. R. Green, Cedar Rapids, Engr.

Ia., Strawberry Point—To construct 1 mile of sanitary sewer with sewage disposal plant this season. Plans in progress. Wm. F. Reinecke, Mayor; H. R. Green, Cedar Rapids, Engr.

Kan., Hutchinson—Three new sewer districts have been established and system will be extended to cover them. Chairman, Bd. of Comrs.

La., Alexandria—$525,000 municipal bonds for public improvements has been carried at election held here. Bonds will be used for construction of gas plant and distributing system, extension of sewer system, improvement of drainage, city jail and court house, improved water supply, improvement in street railway system and new city stables and equipment.

Mich., Dearborn—City having plans prepared by C. W. Hubbell, Engr., 2348 Penobscot Bldg., Detroit, for 40,000 ft. 12, 15 and 18-in. vitrified storm lateral sewers.

Mich, Lansing—City Council will consider resolution providing for bond issue of $85,000 for sewers.

Minn., Duluth—City Council considers appropriation of $40,287 for constructing storm sewers in two avenues.

Mont., Butte—Improvement district will be created for purpose of constructing permanent sanitary sewers and an outlet sewer to Silver Bow Creek at cost $14,050. Property within this district will be assessed for costs of construction, which will amount to $.0132 a sq. ft. County Engr. M. J. Loughran will be in charge.

Mo., Kansas City—Board of Public Works adopted resolution calling for construction of Turkey Creek sewer, which will start immediately and cost $1,500,000.

Neb., Grand Island—City will vote on $200,000 bond issue for sewers. H. W. Kibbey, Engr. H. E. Clifford, Clerk.

N. J., Garfield City—City Engr. Pettersen reported that proposed sanitary sewer would cost $23,395.

N. J., Irvington—The Irvington Town Comn. have passed ordinance providing for construction of intercepting storm water sewer from Ney Ave. to Delmar Pl.

N. Y., Niagara Falls—The 1919 public improvement work in Niagara Falls is about to be started. One of the biggest sewer contracts to be let is for sewer ranging from 30 to 40 ins. in diameter in Sugar St., distance of 24 city blocks. The estimated cost $206,700. Next in importance will be 24th St. sewer, to be laid at estimated cost of $99,700. Another contract to be let is tunnel sewer, ranging in dimaeter 42 to 54 ft., in Royal Ave. It will be 375 ft. long; estimated cost is $67,000. Contract will be let for small sewer in James St. It is estimated to cost $14,000.

N. Y., Schenectady—Council received sealed bids June 24 on bond issues of $48,000 and $60,000 for sewers.

O., Akron—Service Dir. H. S. Morse states that the city will advertise at once for the construction of a large number of sewers to cost $334,000. Plans will be completed by Aug. 1 for additional sewer construction, aggregating $500,000.

O., Canton—Engr. R. Winthrop Pratt, of Cleveland, has begun preliminary surveys for new storage basin at Union dam site. Capacity of the new storage basin will be 1,000,000 gallons. Service Director Zink states that water program will involve outlay of $1,250,000.

O., Lima—Bids will be invited within 30 days on another big sewer project involving outlay of $250,000.

O., Portsmouth—City auditor received sealed bids on June 27 on $35,000 bond issue for sewers.

Okla., Dumright—See "Water Supply."

O., Middletown—City passes ordinances to construct two storm and sanitary sewers.

Pa., Erie—The Council has decided upon the issuance of $112,000 worth of bonds to complete the Mill Creek flood prevention tunnel; also $80,000 to complete Garrison Run storm water sewers.

Tenn., Jackson—City plans to construct 6,000 lin. ft. 12 to 24-in. vitrified storm sewers. J. T. McCutcheon, Comr. Pub. Utilities.

Tex., Stamford—See "Water Supply."

Wash., Yakima—Extension of Yakima's sewer system will cost $364,300, according to estimates just completed. If extension is authorized city will have to issue $350,000 bonds to meet expenses.

Wyo., Lusk—Town Clerk D. E. Goddard will receive bids until July 12 on $200,000 sewer bonds.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Mo., Macon**—The Mayor and City Clk. were instructed to sign contract with William McClurken for erection of sewer disposal works. The contractor is to put up one-half the cost in bonds, as guarantee that work will be in accordance with plans and specifications agreed upon. Cost to be $16,000.

***O., Cleveland**—Master & Mullan Construction Co. has contract for west side sewerage disposal plant at bid of $678,000.

***O., Youngstown**—Patrick Grady has contract for constructing district sewer outlets in Pleasant Grove Dist. at $145,000.

WATER SUPPLY

Fla., Brooksville—Bonds for $12,000 for water improvements have been marketed. W. M. Russell, Town Clk.

Ill., Paxton—Bd. of Supvrs. of Ford Co. favor issuing of bonds amounting to $748,000 for improvement of State-aid Rd.

La., Alexandria—See "Sewerage."

Mass., Cambridge—An order was put before City Council, calling for expert to investigate water system of Cambridge relative to length of time it will adequately supply the city. The Councillor said he wanted immediate action, inasmuch as the members would be called upon to vote on proposition of a filtration plant.

Minn., Waseca—Bids by City Council for about 2,000 ft. water mains. Specifications, etc., with Water and Light Bd.

Miss., Laurel—Bond issue of $17,000 for water works voted. Address City Clk.

Mo., Cameron—Bond issue of $20,000 for water works has been voted. Address City Clk.

Mo., Cameron—City having plans prepared for improving filtration plant. Bonds for $35,000 voted for project. E. E. Harper, 2408 E. 30th St., Kansas City, Consulting Engr.

Neb., Table Rock—Water works improvements; $22,500. Engrs., Arnold C. Koenig & Co., Lincoln, Neb. J. T. Hajny, Village Clk. Drawing plans.

N. J., Paterson—The North Jersey Dist. Water Supply Comn. has recently acquired title to first piece of property bought as a part of the site for the great reservoir in Passaic Co. It is estimated that cost of the project will mount well into millions of dollars.

N. Y., Yonkers—Following the receipt of communication from the Mayor, Council passed ordinance authorizing acquisition of a water grant, measuring 66 ft. which adjoins the property recently taken over to provide playground at Sunset Park. The ordinance directs Public Works. Comr. to acquire the land at price to be approved by Bd. of Estimate and Apportionment.

N. C., Sanford—Bond issue of $12,000 for water works improvement has been ordered. Supt. of Water Dept.

N. D., Leeds—Plans and specifications for the city water works have been received by council. The proposed system consists of 50,000-gallon steel tank, a 100,000-gallon reinforced concrete reservoir and settling basin, a brick pump house, a 100-gallon per minute pump with engine and 21 blocks of 6-in. mains with 14 fire hydrants. Estimated cost of system is $34,173.50.

O., Bellevue—Bond issue of $135,000 to cover cost of building new water storage reservoir here have been sold.

O., Bellefontaine—Ordinance to submit bond issue of $110,000 for improving the water works system and for installation of meter system.

O., Canton—Voters will be asked to approve water works bond issue of $1,252,000 to permit the carrying out of extensive permanent improvements recommended by City Water Comn.

O., Defiance—Council has authorized Engineers Hill and Ferguson of New York City to prepare plans and specifications for new filtration plant, cost of which will be $150,000.

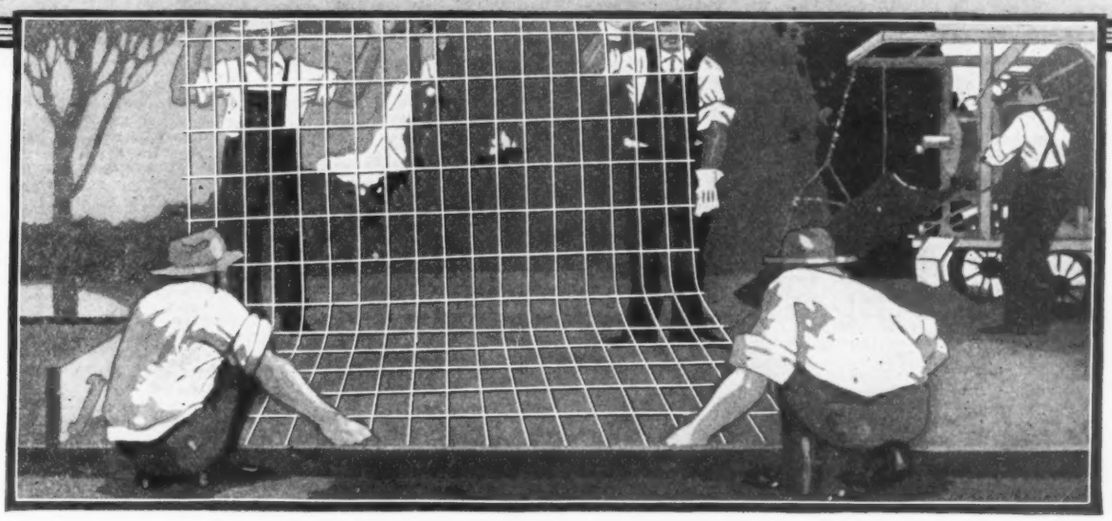
O., Portsmouth—City auditor received sealed bids on June 27 on bond issue of $30,000 for water works extension.

O., Toledo—Service Director Goodwillie will ask Council to authorize two bond issues totaling $900,000 for construction of new service main and addition to present filtration plant. Each bond issue will be $450,000, the first for 42-in. feeder from pumping station to the downtown district, and the other for another settling basin and 22 new filters in filtration plant.

O., Youngstown—A new distributing system that will give all sections of city an adequate water pressure by construction of a belt line has been recommended by H. F. Kaerchner, Supt. of Water Wks., costing $553,000. Plans call for increase in size of the water line from the central pumping station.

Okla., Afton—Election for voting $18,-

CLINTON WELDED FABRIC



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The mesh is immovably rigid—the electric weld holding the intersecting wires absolutely in their relative positions.

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Clinton Electrically Welded Park Baskets have no clips, washers or twists to harbor vermin or dirt.

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SCREEN CLOTH	POULTRY NETTING	WOVEN WIRE FENCING	PERFORATED METALS	MISCELLANEOUS	WELDED SHEATHING	WELDED FABRIC	WOVEN WIRE LATH	PERFORATED METALS
"Pompeian Bronze" "Golden" Bronze "Silver Finish" and Painted"	"Silver Finish" and Galvanized before-weaving	The Pioneer American Hexagonal Mesh Woven Wire Fence	Round, Square, Slot, Oval and Special Perforations in all Metals	Wire Cloth Specialties of many Descriptions	Lath that saves Time, Plaster, and Labor-reinforces and supports	The Rectangular Mesh Wire Fabric for Concrete Reinforcement	The most durable Metal Lath made; used since 1850.	Grilles: Steel, Brass, Copper, Bronze, Ventilator & Register Faces

CLINTON PRODUCTS
"Metal-Made"

000 bonds for improving water works system and $10,000 for improving the electric light plant carried.

Okla., Drumright—Has voted $435,000 water and sewer bonds.

Okla., Okemah — See "Lighting and Power."

Ore., Portland—Residents of West Portland and West Portland Park are planning to organize a company and build a water main extension.

S. D., Sioux Falls—Commercial Club passed resolution presented to City Comrs. calling special election to authorize bond issue of $200,000 to install plant for removal of iron from city water and extending water mains to portions of city.

Tex., Austin—See "Streets & Roads."

Tex., Fort Worth—Many projects under way in west Texas to develop adequate water supply. De Leon, in Comanche county, is spending $90,000 to enlarge water works. Company formed at Eastland to construct dam that will conserve 5,000,000,000 gals. of water. Breckenridge will construct dam 15 ft. high and 600 ft. long. Wichita Falls will finance, by $3,000,000 bonds, construction of dam across Wichita River which will irrigate 110,000 acres as a minimum. Abiline will construct dam which will conserve 15,000,000,000 gals. of water.

Tex., Stamford—City has sold to H. C. Burt & Co., of Houston, $200,000 worth of water works bonds, $35,000 worth of sewerage bonds and $20,000 worth of street improvement bonds. This sale takes care of all issues voted to date by city of Stamford.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Neb., Laurel**—City Council awarded contract for extension of water system to E. L. Dimick. The contract price is $12,800. The council also sold water extension bonds to the amount of $114,000 to Lincoln Trust Co. The contract for paving 10 blocks of streets at an approximate cost of $50,000 will be awarded by the council at a session to be held June 26.

***O., Bellevue**—Fred R. Jones Co., of Cleveland, has contract for new water reservoir here with storage capacity of 140,000,000 gals.; job to be completed in 135 days.

LIGHTING AND POWER

Ia., Storm Lake—An election will soon be held for issuance of $100,000 bonds for erection of municipal light plant.

Kan., Chanute—Proposes to hold election to vote $60,000 electric light bonds.

La., New Orleans—Charity Hospital is to have its own electric power-house, erection of which will cost $90,000.

Minn., Hinckley—Carried at election, $30,000 city light and water bonds. A. J. Hunt, City Clerk.

Miss., Coldwater—Voted $10,000 electric light bonds.

Mo., Sikeston—Has voted $90,000 electric light bonds on June 3.

Neb., Emerson—Emerson Village Council is considering purchase of electric light plant, now owned privately. Recently $20,000 in bonds was voted for establishment of such a plant.

N. Y., Oswego—Upon request of Water Service Comn., City Council authorized sale of $345,000 bonds for construction of power house at Dam No. 6.

Okla., Afton—See "Water Supply."

O., Hamilton—Council will be asked to erect a modern municipal lighting station of from 4,000 to 5,000 kilowatts. Bond issue of $600,000 will be submitted to popular vote.

O., Hamilton—Citizens Electric Lighting Committee recommended erection of modern municipal electric light station of 5,000 kilowatts; cost, $600,000.

Okla., Bartlesville—Prices and plans are being prepared for installation of more city lights.

Okla., Okemah—Election will be held soon to vote $23,000 bonds for improving water system and $50,000 for improving electric lighting system. Earl S. Dossey, City Clerk.

Okla., Tulsa—Public Service Corp. of Oklahoma has purchased tract of 60 acres just outside limits of Tulsa and will erect power plant to generate and distribute electricity throughout territory within radius of 50 miles of Tulsa, according to Fred W. Insul, president of concern. The proposed plant will embrace every modern feature.

Tex., Fort Worth—See "Sewerage."

Tex., Sherman—City Manager Ellingson has submitted plans to City Comn. for erection of power and light plant, according to plans and figures submitted. It will cost $650,000 to equip plant to furnish electric power and lights here.

B. C., New Westminstef—A large power plant is to be installed on Similkameen River at expenditure of $350,000. Power will be used for pumping water for irrigation purposes and for operation of mines in district.

FIRE

Ariz., Miami—Election will be held to decide issuing bonds for improving fire department.

Cal., Maricopa—City Council will install new fire alarm system throughout the city.

N. Y., Green Island—In need of fire protection. Address President of Village.

N. Y., Troy—City to purchase more pumpers for fire department. Address Chief, Fire Dept.

N. Y., Tarrytown—Bonds for purchase of fire apparatus have been offered for sale.

O., Canton—Erection of new fire station has been recommended and city solicitor asked to prepare legislation for bond issue of $26,000 to finance the project. City owns site for the station.

O., Columbus—School Bd. petitioned $1,000,000 for improved fire protection to protect school buildings.

O., Fremont—Citizens will vote on proposition to purchase auto fire fighter at primary election Aug. 12; $10,000 is needed for the equipment. Service Direction Wm. A. Baker recommended the project.

O., Massillon—$12,000 will be expended for underground fire and police alarm system.

O., Xenia—Ordinance to issue bonds of $10,000 to pay for purchase of auto fire engine has passed its final reading. Geo. H. Stokes, Clk. of City Comn.

Ore., Portland—$200,000 to provide for replacing old fire stations by new structures and rebuilding two ships for fireboats is asked on reconstruction ballot.

Pa., Reading—Fire Insurance Underwriters' Assn. will make survey and examination of fire fighting apparatus.

Pa., Summit Hill—Council voted to install complete fire alarm system at estimated cost $75,000.

W. Va., Welsh—City voted bonds of $35,000, part for purchase necessary fire apparatus. Address Mayor.

BRIDGES

Ariz., Phoenix—Bridges form a large feature of Arizona highway improvement program. Plans made for ten bridges.

Cal., Redwood City—See "Sewerage."

Ill., Belleview—The construction of two new bridges on 3d St. is contemplated by the City Council.

Ill., Danville—City plans to replace Gilbert St. bridge with modern reinforced concrete structure of the arch type. Length 1,140 ft.

Ind., Indianapolis—J. J. Griffith, Co. Surv., and members of City Bd. of Public Works held conference for discussion of proposed construction of bridge over Fall Creek, in North Delaware St. Griffith said bridge as suggested would cost $110,000.

Me., Portland—Cumberland Co. have asked sealed proposals on $200,000 bond issue for bridges.—H. H. B. Forbes, Treas.

Mass., Boston—Final figures for the reconstruction of Essex Bridge, between Salem and Beverly, have been made up and the cost apportioned by the Essex Co. Comrs. The total cost was $249,935, of which the Bay State St. Ry. Co. pays $40,165; City of Salem, $73,419; City of Beverly, $52,442, and the county, $83,908.

Mich., Lansing—City Council adopts plans and specifications of City Engr. relating to construction of bridge across Grand St. at estimate of $85,000.

O., Canton—Co. Surv. has prepared plans for Belden Ave. N. E. Bridge and plans have been approved by Comrs. Before contract can be awarded, a portion of land must be appropriated, as plans for the bridge also call for straightening of the road.

Mich., Lansing—City Council will consider bond issue of $80,000 for bridges.

Minn., Duluth—City Council has adopted resolution of Comr. of Works J. A. Farrell for construction of Chester Creek bridge. Estimated cost, $37,653.

Minn., Duluth—City Council pass ordinance appropriating $37,653 for construction of bridge across Chester Creek.

N. Y., Watertown—Watertown voters authorized bonding of the city for $60,000 for erection of a modern bridge in Pearl St.

N. C., Goldsboro—W. P. Rose, chairman of the Highway Comn. of Wayne Co., will receive sealed bids until July 7 for $75,000 5 per cent. bridge bonds.

N. C., Wilmington—At joint meeting of Boards of Comrs. of Bladen and Pender Counties, plans for construction of bridge across Black River at Long View were made and decision to advertise for bids for construction of the work was agreed upon.

O., Bellaire—Bert W. Hopkins, Co. Audr., will shortly advertise bids for bridge over McMahon's Creek, Belmont St., city of Bellaire.

O., Warren—Wm. T. Phillips, Clk., Liberty Twp., states there will be special election, July 7, on bond issue of $100,000 for paving Twp.'s share of constructing bridge over Mahoning River in village of Girard.

Pa., Ambridge—Co. Comrs. will probably proceed with construction of new bridge across Sewickly Creek, between Allegheny and Beaver counties.

Pa., Pittsburgh—The Planning Comrs. also approved recommendation for construction of bridge over Monongahela River, from Pittsburgh to Homestead, to replace one at Brown's station. It will start from high level on Brown's Hill and run to Eighth Ave., Homestead, eliminating railroad crossings.

Wis., Milwaukee—Construction may be started on the long-planned State St. bridge in near future. "All that is nec-

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Minn., Duluth—Lowest bid on Chester Creek Bridge is $2,000 more than cost estimated by City Engr. Second reading has been given ordinance to appropriate $37,653 for the bridge. The bids were as follows: Carl W. Stromgren, $39,987; George H. Lounsberry, $44,200; Illinois Steel Bridge Co., $59,300.

Utah, Salt Lake City—Four bids for construction of twin arch concrete bridge across Provo River at north city limits of Provo were opened by State Rd. Comn. Engineers' estimate of cost was $20,000. The bidders and prices submitted for the work follow: H. G. Gilkerson, $15,138; Schuyler & Sorensen, $17,942; Steel Construction Co., $20,823; Alston-Hoggan Co., $22,392.

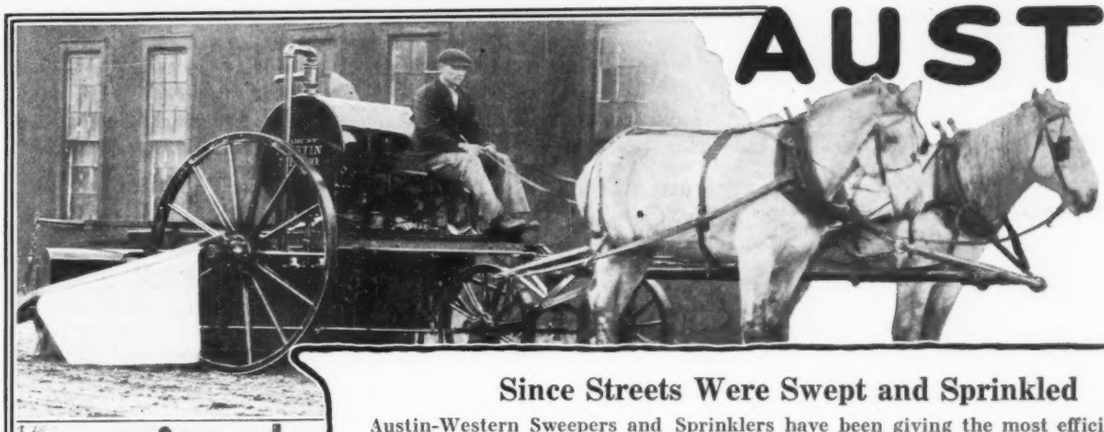
***Okla., Frederick**—Board of County Comrs. has awarded contract for erection of bridges, culverts and installation of rip-rap work to Midland Bridge Co., of Kansas City, Mo., for lump sum of $37,300.

MISCELLANEOUS

Cal., Eureka—City Council has agreed to place on ballot of the special state highway bond election, July 1, a proposition to bond city for $400,000, to be used for construction of municipal auditorium and swimming pool, with four combination city parks and playgrounds.

Cal., Redding (Shasta Co.)—Happy Valley Irrigation Dist. has sold $255,000

AUSTIN



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The name "Austin-Western" has been so long and closely identified with all that is best in street and road building and maintenance equipment, that its stamp is equivalent to the "Sterling" mark on silver, or Lloyd's certificate on a ship. It expresses a high standard of clearly-defined value accepted by owners, users, purchasers and all concerned.

The almost 250 sizes and styles of equipment in the Austin-Western line include:

Street Sweepers
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Combined Sweeper-Sprinkler
Motor Tandem Rollers
Motor Macadam Rollers
Rock Crushers
Portable Stone Bins
Stone Elevators
Stone Screens
Road Rollers
Horse-Drawn Rollers
Road Scarifiers
Stone Spreaders
Road Graders
Elevating Graders
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Dump Wagons
Motor-Drawn Mowers

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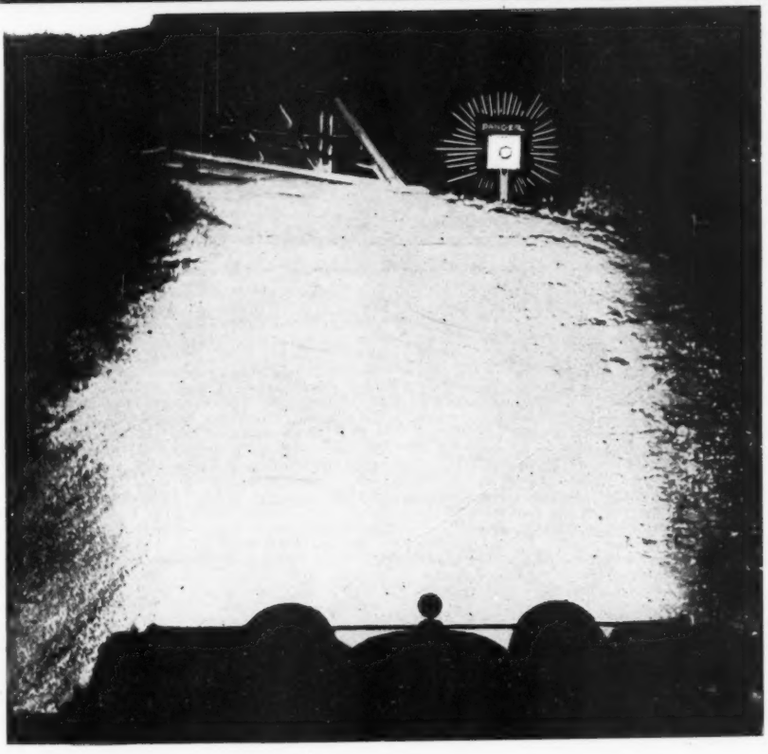

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It may be focused in such a manner that at a point of power one hundred to one thousand feet the signal will appear in the form of a big ball of fire, instantly and unfailingly warning of the danger point ahead.

May be operated for ten years or more without the need of maintenance costs.

It is proof against all weather conditions.

Let us arrange with you for a demonstration of this wonderful signal.

THE AUTOMATIC SIGNAL AND SIGN COMPANY
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Bids received until July 22, 1919.

Highway Work

Office of the State Commission of Highways
ALBANY, N. Y.

Sealed proposals will be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at 1:00 o'clock P. M. on Tuesday, July 22, 1919, for the improvement of the following highways:

CATTARAUGUS—One highway—4.60.
CHAUTAUQUA—One highway—4.29.
CHENANGO — Three highways — 4.78, 5.57 and 5.87.
LEWIS—One highway—4.74.
ONONDAGA—One highway—0.27.
RENSSELAER—One highway—1.44.
SUFFOLK—One highway—3.85.

Also for the Completion of the Following Highways:

CAYUGA—Three highways—8.00, 6.06 and 5.45.
CHAUTAUQUA—One highway—3.90.
CHENANGO — Three highways — 7.12, 7.09 and 3.06.
FRANKLIN—One highway—10.36.
NIAGARA—One highway—7.79.
OSWEGO—One highway—6.36.
SARATOGA—Two highways—6.10 and 5.74.
SENECA—Two highways—4.89 and 2.13.

And also for the Repair of the Following Highways:

ALLEGANY, SCHUYLER and STEUBEN—One contract—surface treatment.
OSWEGO—One contract—resurfacing.
SUFFOLK—One contract—reconstruction.

And also for the Completion of: (Repair Contracts)

CHENANGO—One contract—resurfacing.
CORTLAND—One contract—resurfacing.

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the division engineers in whose division the roads to be improved, completed and repaired are located. The addresses of the division engineers and the counties of which they are in charge will be furnished upon request.

The especial attention of bidders is called to "General Information for Bidders" on the itemized proposal, specifications and contract agreement.

FREDERICK STUART GREENE,
Commissioner.

ROYAL K. FULLER, Secretary.

Bids received until July 14, 1919.

Paving

SHENANDOAH, PA.

Bids will be received by the Borough of Shenandoah, Pa., for paving 9,500 square yards with wood block, vitrified brick, sheet asphalt, tarvia or any suitable paving material; also for covering with asphalt 3,177 square yards of old Belgian block. All bids to be in by July 14, 1919. Specifications can be seen at the office of DAVID T. GLOVER, Borough Engineer.

Bids received until July 7, 1919.

Street Improvement

WAVERLY, N. Y.

Bids will be received by the City of Waverly, New York, until 7:00 P. M., July 7, 1919, for street improvement consisting of about 1,200 yards excavation, 1,800 yards of compressed gravel pavement, 2,200 yards of reinforced concrete pavement, 1,400 feet of curb and gutter and 1,450 feet of concrete curb.

Address inquiries to PHILIP KERRIGAN, Village Clerk, Waverly, N. Y.

Bids received until July 28, 1919.

Sewer Construction

ABERDEEN, S. DAK.

Notice is hereby given that sealed bids will be received by the Auditor of the City of Aberdeen, South Dakota, until 9:00 o'clock A. M., on Monday, July 28, 1919, for the furnishing of material and labor and constructing a storm sewer for the City of Aberdeen, South Dakota, at which meeting of the Board of Commissioners of said city all proposals will be opened.

All material and work must be in accordance with the plans and specifications on file at the office of the City Engineer and City Auditor.

The work to consist of approximately eight (8) miles of vitrified, segmental block or concrete pipe, running in diameter from 10 inches to 96 inches, with 100 manholes and 212 catchbasins.

Any prospective bidder desiring a set of the plans for personal use may obtain same from the City Engineer by making a deposit of ten dollars ($10) to cover the cost of the blueprints. Refund of one-half the amount deposited will be made on the return of the plans and specifications to the City Engineer within five days following date of receiving bids.

Each bid must be accompanied by a certified check, payable to the City of Aberdeen, in the amount of one thousand dollars ($1,000). Said check will be returned to unsuccessful bidders upon award of contract and to successful bidder when his bond has been approved for the faithful performance of the work.

The city reserves the right to reject any or all bids.

By order of the Board of Commissioners of the City of Aberdeen.

F. W. RAYMOND,
City Auditor.

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more bonds. Bonds bear 6 per cent interest and run for forty years. The district already has sold $265,000 worth. Second sale realized enough, it is believed, to complete the system.

Fla., Charlotte Harbor—Enlargement of authorized improvement at Charlotte Harbor, Fla., so as to provide channel 47 ft. deep and 300 ft. wide from Gulf of Mexico to town of Bonca Grande was recommended by government engineers, who estimated the increased cost would total $100,000.

Ill., Chicago—City Council plans expenditure of $110,000,000 for improvement of lake front. Five great beaches will be constructed between 12th and 47th Sts.

Ill., Danville—Garbage incinerating plant is in course of construction. Bids for equipment of same to be received soon.

Ind., Indianapolis — City Controller Robert H. Bryson will receive sealed bids July 5 for 5-month loan of $400,000.

Ind., Indianapolis—Petition for issuance of $512,000 bonds by the park board was filed with Board of State Tax Commissioners. For the program of development of community centers for 1919, $250,000 is needed, the petition sets forth Acquisition of real estate will require $147,000. The construction program calls for $25,000 to replace bridge over Pleasant Run in Garfield Park, and $35,000 each for shelter houses in Garfield and Brookside parks.

La., Baton Rouge—Special election to vote on $10,000 park bond issue in ordinance passed by Baton Rouge City Commission. The money will be used to purchase, improve and equip park site.

N. Y., Niagara Falls—Appropiration of $10,000 for construction of municipal wading pool is available for swimming pool, including wading space. Plans for modern outdoor swimming pool are in hands of city manager.

N. Y., Oswego—City has made appropriation of $50,000 for deepening its harbor.

Pa., Philadelphia—Issue of $12,000,000 of 4½ per cent. Pennsylvania State Rd. bonds has been awarded syndicate consisting of Biddle & Henry, of Philadelphia, the Liberty National Bank of New York, Halsey, Stuart & Co., and others, at 103.529. The bonds mature in an average of 17½ years.

O., Cleveland—Cuyahoga Co. proposing improvement by straightening of river channels. Cost to be $7,000,000.

O., Cleveland—City adopted resolutions to issue bonds of $100,000 for construction of public baths.

O., Zanesville—The War Dept. has been asked to send an expert engineer to this city to advise the city relative to flood protection.

Okla., Pawhuska—City voted bonds of $40,000 for city hospital and $10,000 bonds for parks. J. M. Buckley, City Engr.

Ore., Portland—Bid received by City Council for dredging the channel from Columbia slough to Columbia river was promptly rejected. The Pacific Bridge Co. was only bidder. Bid submitted was $391,700. Council considered this too great an excess over City Engr. Laaurgard's estimate of $273,000.

Books on Water Purification

Elements of Water Bacteriology.
By S. C. Prescott and C. E. A. Winslow.

Is in its third edition. Contains about 270 pages, and while it pretends to deal with only the elements of the subject, these elements are treated in a thoroughly scientific manner by experts on the subject. Price, $1.75.

The Value of Pure Water.
By George C. Whipple, of Harvard University.

The purpose of this book is to illustrate the fact that impure water affects not only the health and comfort of a community, but also the pocketbooks of the people. It contains 80 pages and sells at $1.00.

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STREETS AND ROADS.

Ind., Indianapolis. 10 a.m., July 16.
14,873 ft. reinforced concrete road in Washington Twp. and 3,600 reinforced concrete road in Center and Washington Twps.—L. K. Fesler, Co. Aud.

Ind., Columbia City. 2 p.m., July 19.
Three gravel roads in Columbia and Union Twps. and a slag base and gravel road in Union Twp.—W. K. Burwell, Co. Aud.

Ind., Huntington. 2 p.m., Aug. 5.
Co. line road between Whitley and Huntington counties.—O. E. Eviston, Co. Aud.

Mass., Boston. noon, July 7.
Sheet asphalt, topeka, bitulithic or filbertine pavement in city street.—T. K. Sullivan, Comr. Pub. Wks., 508 City Hall Annex.

Mass., Boston. noon, July 9.
Sheet asphalt, topeka, bitulithic or filbertine pavement in city streets.—T. K. Sullivan, Comr. Pub. Wks., 508 City Hall Annex.

La., Lake Charles. July 12.
14,000 sq. yd. street paving.—City Council.

Miss., Brandon. July 7.
Six mi. road involving 12 acres clearing and grubbing, 43,000 cu. yd. grading, 9,500 cu. yd. gravel, 6 mi. sodding and 225 lin. ft. culvert pipe.—State Hwy. Dept., Jackson.

Miss., Monticello. noon, July 15.
Eleven mi. road between Jackson and Gulfport, involving 69,000 cu. yd. grading, six acres clearing and grubbing, 11 mi. sodding, 700 lin. ft. culvert pipe, etc.—State Hwy. Dept., Jackson.

Miss., New Albany. noon, July 18.
Twenty-four mi. road between Tupelo and Memphis, involving 48,000 cu. yd. gravel.—State Hwy. Dept., Jackson.

Miss., Winona. noon, July 17.
9.3 mi. road between Jackson and Memphis, involving 16,900 cu. yd. gravel.—State Hwy. Dept., Jackson.

N. M., Santa Fe. 3 p. m., July 15.
Federal Aid Project No. 4, in Valencia Co.—L. A. Gillett, State Hwy. Engr.

N. Y., St. George, S. I. noon, July 14.
3,450 cu. yd. 1½-in. broken stone, 290 cu. yd. ¾-in. broken stone, 1,440 cu. yd. screenings, 100 cu. yd. broken stone chips or trap rock, and 580 cu. yd. grits.—C. D. Van Name, Pres., Boro. of Richmond.

Ore., Portland. 10 a.m., July 8.
Forty-nine mi. highway in Grant and Wheeler counties, involving 359,000 cu. yd. excavation; 16.7 mi. highway in Harney Co., involving 95,000 cu. yd. excavation and 15,400 cu. yd. gravel surfacing.—M. O. Bennett, Div. Engr., Pendleton.

Tenn., Blountville. July 10.
Macadam roads.—Co. Comrs., Sullivan Co.

W. Va., Huntington. July 15.
Grading, draining, concrete curbing, brick paving, etc., on one mi. road in Cabell Co.—Co. Court.

SEWERAGE.

Ind., Indianapolis. 10 a.m., July 11.
Local sewers in city streets.—Bd. Pub. Wks.

Mass., Boston. noon, July 7.
Sewerage works.—T. F. Sullivan, Comr. Pub. Wks., 508 City Hall Annex.

Wis., Janesville. 2 p.m., July 10.
18,128 lin. ft. 8 to 12-in. sewer, 48 manholes and 13 lampholes in city streets.—City Clk.

LIGHTING AND POWER.

Ind., Indianapolis. 10 a.m., July 9.
Installing new stoker interiors and extending present stoker fronts 4 ft. forward on eight 250-h. p. boilers; installing necessary air pump, receiver tank and air-driven tube turbine with air distributing lines to hose connections; installing atmospheric relief valve, nine draft gauges, one recording pressure gauge, etc., in Central Indiana Hospital for Insane.—F. H. Miller, Combustion Engr., 315 Traction Terminal Bldg.

FIRE EQUIPMENT.

Mass., Boston. noon, July 15.
Furnishing 1½ to 2-ton motor truck for fire department.—J. R. Murphy, Fire Comr., Bristol St.

N. Y., New York. 10.30 a.m., July 10.
Five motor-drive city service hook and ladder trucks.—T. J. Drennan, Fire Comr.

Pa., Johnstown. noon, July 8.
One front-driven 75-ft. aerial truck with not less than 70-h. p. motor.—W. W. Campbell, Supt. Pub. Safety, City Hall.

BRIDGES.

Cal., El Centro. 2 p.m., July 7.
Two bridges over Alamo and New rivers in Imperial Co.—Co. Surv.

Ind., Hartford City. 2 p.m., July 21.
Two bridges in intersection line between Blackford and Jay counties.—W. C. Hughes, Co. Aud.

Minn., Duluth. 11 a.m., July 8
Concrete bridge across Chester Creek.—J. A. Farrell, Comr. Pub. Wks.

O., Columbus. July 16.
Bridge over Hayden Run in Norwich Twp., Franklin Co.—Co. Engr.

STREETS AND ROADS.

Fla., Daytona — Daytona property owners will be asked to vote on bond issue to amount of some $425,000, to be spent on network of new paving construction.

Ga., Savannah—Federal aid for the Tybee Rd. will be next step of Chatham Co. Comrs. if the $2,500,000 bond issue for roads, including an item of $1,000,000 for the Tybee project, carries.

Ind., Evansville—The Owensville Rd. in Armstrong Twp. and the Law Ave. Rd. in Perry Twp. were ordered improved by Co. Comrs. in accordance with new county unit road law. Comrs. announced that new bridge would be placed over Decker Rd. to take the place of 26-ft. concrete bridge which was swept off its foundation.

Ia., Spencer—Clay Co. considering bond issue of $800,000 for hard surfacing its road system.

Kan., Independence—Good Roads Assn. proposed to city the building of gravel road from Independent to Cherryvale, also to Caney, and from Independence to Elk City.

La., New Orleans—Bids for paving will be announced next month. Streets to be paved include area from Thalia to Canal St., and from Camp St. to the river. Approximately, cost of paving will be $1,500,000. It is thought cost of subsurface drainage will be close to $150,000.

Mass., Chicopee—Bd. of Aldermen passed order for paving East St. with National pavement at cost of $12,695; also for paving West Main St. with same material, cost to be $27,280. Orders for other street paving and sewerage given consideration.

Neb., Omaha—$3,000,000 bond issue for good roads has been passed by Douglas Co. Bd. of Comrs. plan immediate action.

Pa., Johnstown—At recent bond issue election in Croyle Twp., taxpayers voted in favor of bond issue of $138,000. One of proposed road improvements will be from Summerhill to Cambria Twp. Another from Lamb's Bridge, extending along Frankstown Rd. to Summerhill Twp. The other will start at Lovett and connect with Summerhill Twp.

Tex., Clairemont—Contract has been let for construction of steel bridge across Salt Fork of the Brazos River in Kent County. The new highway to follow the building of the South Fork steel bridge will run from Hamlin to Jones Co., via Clairemont to Snyder, at edge of the South Plains country.

Tex., Dallas—City Council has been requested to order pavement on Davis St. City Engr. estimates cost at $90,000.

Tex., Electra—City is asking for bids on 64,000 sq. yds. of sidewalks, which they will put in in the near future, preparatory to establishing free mail delivery.

Tex., Gonzales—M. C. Welborn and Charles Harrison, Div. Engrs. of State Hwy. Comn., are to make official inspection of work on Hwy. No. 3. Some of the highway has been completed, but work has been interefered with by continued rains.

Tex., LaGrange—The election for bond issue of $200,000 for road construction in Precinct No. 1 carried. Rd. Dist. No. 4, Fayetteville, voted issuance of $75,000 bonds for roads in that district.

Tex., San Angelo—Petitions for the calling of election in Valverde Co. on issue of $400,000 to $500,000 in good roads bonds are expected to be circulated early in July. Interest in good roads has been stimulated by recent construction, at cost of $40,000, of first five mi., leading north from Del Rio, of the Del Rio-Canadian State Hwy. No. 4. Road was laid with asphalt surface and is said to be one of the best in the state.

Tex., Vernon—Street paving for 42 blocks was ordered by Comn. Specifications call for bitulithic and asphaltic concrete, reinforced by coat of concrete and brick. Bonds to extent of $30,000 recently voted for this purpose.

Tex., Warrenton—Bond election for highway for Warrenton, Round Top and Carmine was carried. Proposed highway is extension of highway from Schulenburg through La Grange to Washington Co. line.

Tex., Weatherford—Survey is being made on the Weatherford-Fort Worth Rd. preliminary to beginning road paving in this county. The first work will be done on Weatherford-Fort Worth-Dallas part of the Bankhead Hwy., this being the greatest traveled road in the county.

Ont., Cobalt—The Provincial Government has commenced construction of macadam road, from Elk Lake to Gowganda, a distance of about 28 mi. Estimated cost, $300,000.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

***Ind., Indianapolis**—The Marion Co. Construction Co. received contract for resurfacing West St., from South to Morris Sts., with asphalt, at $4.18 a lin. ft. of property frontage, and $5.55 a ft. for one-half of street intersections. Total bid was $28,497.38.

***Ind., Indianapolis**—Contracts for construction of English Ave. Rd. Impvt. and Sherman Drive Rd. were let to Marion Co. Construction Co. by Bd. of Co. Comrs. The English Ave. contract was let for $87,500, and contract price for the Sherman Drive improvement was $10,000. Both roads are to be paved with asphalt.

La., New Orleans—Bids on New Orleans-Houma and the New Orleans-Baton Rouge Hwy. were received at office of Louisiana State Hwy. Dept. Only three bids were received, as follows: Paxton Miller, $76,465.24; S. A. Gano, $89,035, and W. S. Bonner, $140,174.40. Action has been deferred. This is Government Project No. 42.

***N. Y., Syracuse**—Contract for building Baldwinsville-Plainville Rd., No. 1507, was awarded Pathfinder Construction Co., of Fulton, by Frederick Stuart Greene, State Comr. of Hwys. The bid is $225,984.25. Work will begin at once. One other award was announced. Comr. Greene gave John Gordo, of Albany, contract for construction of the Scott-Borodino Rd., No. 1519, at cost of $86,724.60.